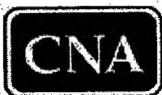# The Navy Survey on Reenlistment and Quality of Service: Using Choice-Based Conjoint To Quantify Relative Preferences for Pay and Nonpay Aspects of Naval Service

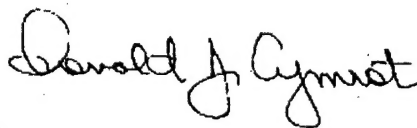Amanda B. N. Kraus • Diana S. Lien
with
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CNA

Approved for distribution: August 2003

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14. ABSTRACT: (U) The primary tasking for this project was to develop a choice-based conjoint (CBC) model of Sailors' preferences for reenlistment incentives and quality-of-service factors to learn more about how compensation-based reenlistment incentives compare with non-compensation factors in influencing reenlistment decisions. In response to this tasking, we designed the Navy Survey on Reenlistment and Quality of Service (NSRQOS), and sent it to approximately 9,000 first-term Sailors. The survey results indicate that, even with several measures of pay included in the survey, non-pay factors play a substantial role in guiding Sailors' reenlistment intentions.

(U) The secondary tasking was to demonstrate how CBC survey data and models can be used to analyze personnel issues. Based on a review of the relevant literature, we concluded that CBC surveys are most appropriate for short-term applications in which the decisions of interest are made on the basis of competitive differences between a few well-known attributes. Therefore, the best Navy personnel applications of the CBC methodology would be analyses of proposed policies that entail well-defined trade-offs between a few characteristics. Furthermore, use of CBC results should focus on the relative effects of different characteristics; results should not focus on absolute changes in predicted reenlistment rates or program participation rates.

15. SUBJECT TERMS: Reenlistment behavior; reenlistment intentions; reenlistment incentives; pay elasticity; quality of service; preference survey; choice-based conjoint (CBC); discrete-choice modeling; hierarchical Bayes estimation; disk by mail; survey response rates

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Executive summary

Background and objectives

Early in his tenure as Chief of Naval Operations, Admiral Vernon Clark defined the notion of quality of service (QOS) as a balanced combination of quality of life and quality of work, and he made improving QOS one of his top five priorities. To learn the best way to achieve that objective, the Assistant Deputy Chief of Naval Operations, Manpower and Personnel (N1B), asked CNA to develop a choice-based conjoint (CBC) survey of Sailors' preferences for pay and other QOS factors. In response, we designed the *Navy Survey on Reenlistment and Quality of Service* (NSRQOS), and mailed it to roughly 9,000 Sailors preparing to make their first reenlistment decisions.

The CBC approach is relatively new for the Navy and is still considered unproven. Thus, in addition to informing first-term reenlistment policies, an equally important objective of this project is to demonstrate how CBC survey results can be used to analyze personnel issues. Along with reporting the results of the NSRQOS, we make recommendations about when CBC surveys should be undertaken and discuss the best ways to use CBC output.

The CBC approach

CBC is a flexible and realistic survey design option that provides an alternative source of data for statistical analysis when appropriate historical data are not available and behavioral experiments are not feasible. The greatest strength of the CBC methodology is its ability to capture the tradeoffs respondents make when choosing one option out of a set on the basis of differences between a few, well-known attributes. To fully exploit this strength, the most appropriate use of CBC results for personnel planning is to assess Sailors' preferences over characteristics of well-defined benefits or incentive programs. For

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example, a CBC survey was used to make initial estimates of the levels of assignment incentive pay that would be necessary to attract Sailors to more and less desirable locations (see [1]).

Another important feature of the CBC methodology is that it provides the ability to explicitly quantify relative preferences for different policies using a metric that is common across all survey items and respondents. This is an important advantage over more traditional survey techniques. Rather than learning only that a majority of Sailors prefer program A to program B, CBC results tell us the strength of that preference.

In contrast, CBC models should *not* be used to predict absolute changes in the probability of reenlistment (or any other choice likelihood). Also, great care should be exercised when using CBC results to assess program cost-effectiveness. Both of these caveats are necessary because such estimates are sensitive to the baseline choice probabilities defined by the researcher.

Survey results

The primary purpose of the NSRQOS was to increase understanding of how Sailors make tradeoffs between pay and nonpay QOS factors when considering their reenlistment decisions. The NSRQOS gathered data on Sailors' preferences for nine QOS factors and four different types of pay. The 13 survey items were: increases in basic pay, sea pay, and the selective reenlistment bonus (SRB) multiplier; different payment methods for the SRB; matching payments to thrift savings plan (TSP) contributions; second-term obligation lengths; second-term assignment guarantees; different amounts of time doing work that uses training and skills; changes in promotion schedules; restrictions on contacting Detailers; guaranteed time for voluntary education; changes in shipboard living space; and options for housing during in-port sea duty.

We analyzed the survey data by examining the impact of changes in the different job characteristics on a baseline reenlistment rate. For QOS changes resulting in *increases* from the baseline, we calculated pay-equivalent values, equal to the percentage increases in basic pay

necessary to achieve the same increases in predicted reenlistment. For QOS changes resulting in *decreases* from the baseline, we calculated pay-equivalent compensation levels, equal to the accompanying percentage increases in basic pay that would be necessary to keep predicted reenlistment rates constant at the baseline level.

The survey results indicate that, even with several measures of pay included in the survey, nonpay factors play a substantial, measurable role in guiding Sailors' reenlistment intentions. More specifically, the two highest impact QOS improvements are location and duty-type assignment guarantees. These nonpay factors had pay-equivalent values of 5.7 and 4.3, respectively, indicating that Sailors value these guarantees as much as pay increases in the range of 4 to 6 percent. In addition to these QOS improvements, a 7-percent limit on matches to TSP contributions—a pay-related variable—also had a relatively large positive impact on reenlistment intentions; its pay-equivalent value of 2.8 appears to indicate a reenlistment effect that is larger than the monetary value of the benefits would imply.

The two QOS changes with the largest negative impact on reenlistment intentions are requiring Sailors to live on ship or in group housing rather than in civilian housing during in-port sea duty. The estimated pay-equivalent compensation levels for these factors are 12.6 and 7.7, respectively. These results indicate that to maintain the same reenlistment rate associated with living in civilian housing, it would be necessary to increase the pay of Sailors living on ship, for example, by nearly 13 percent. With a pay-equivalent compensation level of 5.3, granting later-than-expected promotions also had a substantial negative impact on reenlistment intentions.

The survey results give strong evidence of how deeply Sailors feel about a broad range of job characteristics. This evidence can play an important role in designing new personnel policies. However, the results tell only about the potential relative reenlistment effects of the policies covered in the survey. They do not contain any information about the relative or absolute costs of implementing these policies. Until information on both costs and benefits is available, our recommendations must focus on identifying areas that merit further exploration rather than making definitive recommendations regarding what policies should be implemented.

Introduction

> You will direct the commanding Officer at the Rendezvous to enquire of each seaman entered whether he would be willing to enlist for five instead of three years if a proportional increase of bounty was paid to him and report the results of such inquiry from time to time to the Department.
>
> —J. K. Paulding, Secretary of the Navy, June 11, 1839[1]

The Navy has a long history of collecting stated intention and preference data to gauge the likely impact of incentives on future enlistment and reenlistment behavior. This study continues that tradition by exploring the potential value of choice-based conjoint (CBC) surveys and models as a new means to collect and analyze such data.

Background and objectives

On assuming duties as the Chief of Naval Operations (CNO) in July 2000, Admiral Vernon Clark declared a "battle for people." To win that battle, he set a goal to improve the quality of service (QOS) for every Sailor [2]. In the following months, the CNO defined his notion of QOS as a balanced combination of quality of life and quality of work, and he made improving QOS one of his top five priorities.

But what does it mean to improve QOS? Which QOS factors are most important to the fleet's Sailors and how do these QOS factors compare with pay in terms of their power to keep people satisfied and in the Navy? In pursuit of answers to these questions, the Assistant Deputy Chief of Naval Operations, Manpower and Personnel (N1B), asked CNA to develop a CBC survey and an accompanying CBC model of Sailors' preferences for pay and other QOS factors. In

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1. This letter from J. K. Paulding, then Secretary of the Navy, was addressed to Commodore Lewis Warrington, Commodore of U.S. Navy Yard, and was carbon copied to all other Navy Yard Commodores.

response to this tasking, we designed the *Navy Survey on Reenlistment and Quality of Service* (NSRQOS), and sent it to about 9,000 first-term Sailors preparing to make their first reenlistment decisions.

This study was launched just as the Navy was preparing to implement a new retention/exit survey to be taken by all Sailors at any transition point. That survey, known as Argus, represented a significant investment in the Navy's commitment to increasing its understanding of why some Sailors leave and others stay. Although the CBC model we estimate in this study is also based on survey data, it provides information that is fundamentally different from the information provided by Argus because of differences in the way the two surveys are designed. Specifically, the CBC survey collects preference data in a way that allows us to directly estimate how Sailors make tradeoffs among different job factors when considering future reenlistment decisions. Data collected with Argus and other traditionally designed opinion surveys cannot be used to quantify the tradeoffs in the same manner.

The CBC approach is relatively new for the Navy, and is still considered unproven.[2] In addition to informing policies designed to maintain or improve first-term reenlistment rates, an equally important objective of this project is to demonstrate how CBC survey data and models based on such data can be used to analyze personnel issues. Consequently, along with reporting the results of the NSRQOS, we will make recommendations about when CBC surveys should and should not be undertaken in the future and discuss the best ways to use CBC output.

Response context—prevailing political and economic environment

Before considering survey responses regarding first-term reenlistment intentions and preferences, it is important to consider the political and economic environment that prevailed while the survey was being fielded. The survey was in the field from mid-November 2002 to mid-February 2003. During these 14 weeks, all the Services were

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2. See [1], [3], and [4] for other Navy applications of CBC analysis.

preparing for imminent war with Iraq as part of the War on Terrorism that followed the attacks of September 11, 2001.[3] As a result, actual reenlistment rates just before and during the fielding period were much higher than average, and higher than they were when the study tasking was first conceived in the early part of FY01. Table 1 shows that, from 1997 through 1999, first-term Zone A reenlistment rates averaged about 40 percent. In FY00, the rates increased to 46 percent; in FY01 and FY02, they spiked to 57 percent.

Table 1.   Zone A reenlistment rates by fiscal year[a]

FY	All	Male	Female
1997	36.5	36.4	37.0
1998	40.7	40.6	41.3
1999	41.5	41.7	40.2
2000	46.9	47.1	46.3
2001	57.2)	57.5	55.2
2002	56.7	56.8	56.4

a. Source: EMR, quarter and fiscal year.

It is likely that economic conditions also contributed to the increase in reenlistment rates and affected people's overall attitudes toward reenlistment. Uncertainty regarding the war was slowing the economy's recovery from the recession that followed the burst of the "dot com" stock market bubble in 1998-1999. Thus, for the 4 months that the survey was in the field, the average civilian unemployment rate for workers aged 20 to 34[4] was 7.5 percent, compared to 7.4 percent the year before, and up from 5.3 percent in 2000-2001.[5]

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3. U.S. and British troops invaded Iraq on 20 March 2003.

4. Ninety-seven percent of our sample is in this age range. See table 3 (p. 33) for more information on the age distribution of the sample, as well as other demographic characteristics.

5. For men only in the same age category and for the same 4 months, the average unemployment rates were 6.0, 5.4, and 3.5 percent in 2002-2003, 2001-2002, and 2000-2001, respectively. Source: Labor Force Statistics from the Current Population Survey, U.S. Department of Labor, the Bureau of Labor Statistics, http://data.bls.gov/cps/.

Clearly, these were unusual times, and this must be considered when interpreting our results. Therefore, we will make particular note of findings that may be sensitive to changes in economic or political conditions.

Organization of document

Reflecting the dual tasking for the project, this report gives as much weight to methodological concerns as to the reporting of survey results. The paper has three main parts. In the first part, we describe the CBC approach and compare it with other, more familiar analytical methods. We discuss the differences between using survey data to analyze reenlistment intentions and personnel data to analyze reenlistment behavior, as well as the differences between data collected with a CBC survey and data collected using other survey designs.

The second part of the report deals with the NSRQOS and its results. First, we describe the survey instrument, including discussions of the survey items and the overall survey design. Then we describe the fielding process and the resulting sample. Following this background, we present the results of the survey. We begin by reporting respondents' explicitly stated reenlistment intentions and comparing these intentions to actual behavior for the subset of Sailors whose survey responses can be matched to personnel data. Next, we give a brief description of the CBC model and move to the main presentation of survey results, which shows the impact on reenlistment intentions of QOS changes relative to changes in basic pay. These sections of the report are intended to stand alone so that they can be understood in isolation by readers who are interested in the survey results only.

In the third part of the report, we return to more general methodological issues. We discuss how to use the results of CBC surveys, using examples from our study. Next we consider what types of research questions CBC surveys can appropriately address. Finally, we make recommendations regarding future applications of the technique.

The final section, summary and recommendations, pulls together all three parts of the document.

The CBC approach

Why do we need something new?

Appropriate administrative data are not always available

The goal of this study is to measure how Sailors value nonpay factors relative to pay when making reenlistment decisions. More generally, we want to learn about Sailors' relative preferences for different characteristics of a Navy job. The ideal research approach would be to analyze data on actual reenlistment decisions to see what tradeoffs Servicemembers made when faced with real choices. This would provide information on how actual reenlistment decisions are influenced by different levels and types of compensation, as well as nonpecuniary aspects of naval service.

In the jargon of the discipline, data generated from actual behavior are called revealed preference (RP) data because people's preferences are revealed by their actions. Estimation of econometric models based on RP data is the most common approach used by personnel planners and researchers to evaluate and predict the retention effects of different policy changes. Over the years, RP-based studies have examined the impact of a wide range of factors on Sailors' likelihood of remaining in the Navy. Some examples are changes in perstempo [5, 6], incidence of sea duty [7, 8], offering a basic allowance for housing (BAH) to E-4 Sailors [9], and increases in basic pay and the selective reenlistment bonus (SRB).[6] These studies have found that both retention and reenlistment rates are positively correlated with improvements in these job characteristics.

Although these studies yield valuable insight into how Servicemembers respond to changes in pay and working and living conditions, the RP approach has at least four major limitations. First, by definition,

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6. For a review of the literature on the effects of SRBs and basic pay on retention, see [10].

RP data can be used to analyze only the effects of programs and program levels that have already been implemented, and to which Sailors have had the chance to respond. This limitation is binding for our study because we are interested in evaluating the potential impacts of higher-than-current compensation amounts and QOS improvements that haven't been implemented. Second, RP data that are collected as part of personnel records capture actual outcomes, but do not always capture the range of choices available to individual decision-makers. This is true because Servicemembers typically aren't offered the explicit opportunity to trade between monetary and nonmonetary forms of compensation. For example, unlike some private-sector employees, Servicemembers cannot opt out of the medical insurance program in favor of more take-home pay. Third, with administrative RP data, we can analyze how Sailors' reenlistment decisions change over time in response to policy changes, but we can't usually observe how Sailors within a given cohort respond to different combinations of pay and nonpay factors. Finally, some types of QOS factors are not, and cannot easily be, captured with administrative data.[7] Therefore, most RP-based models of reenlistment behavior are subject to some degree of left-out-variable bias.

Other surveys don't provide the right kind of information

In the absence of relevant RP data, researchers can fill the gap by conducting experiments or pilot programs. However, because these options are usually expensive and time consuming, they are not frequently used. The next best solution, then, is to conduct a survey. Survey questions can be of two general types. The first type asks people to report facts, such as their education levels, their incomes, and whether they participate in certain types of activities or programs. Responses to fact-based questions can provide good proxy measures of actual behavior when such data aren't collected administratively; thus, this would be a form of revealed preference data. For example, using data from quality-of-life (QOL) surveys,[8] several sets of

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7. For example, although it would be possible to track the number of hours Sailors work in a given week, it would be much more difficult and costly to track how those hours are spent.

8. Examples of QOL surveys include DMDC's 1999 Survey of Active Duty Personnel, NPRST's Navy-wide Personnel Survey, and the Navy's QOL Domain Survey.

researchers have analyzed the relationships between the reported use of various QOL programs and reenlistment decisions. These studies have generally found a positive effect of QOL program use on Sailors' retention and continuation behavior.[9]

The second type of survey question asks people about their preferences. Data collected using this type of question are known as stated preference (SP) data. Preference-based questions are used in a number of Navy surveys, including Argus, the Navy Retention/Separation Survey, the 1996 Navy Homebasing Survey, and the 1998 Navy Personnel Pay Survey. The QOL surveys discussed above included preference-based, in addition to fact-based, questions. Preference-based questions can be posed in many different ways; typically, they ask people to rate or rank different items of interest. For example, questions on Argus ask respondents to rate Navy job characteristics, such as benefits and leadership, on a 5-point "influence to stay" scale. In other surveys, respondents were asked to rate their overall satisfaction with Navy life[10] and to indicate their willingness to reenlist given different job bundles.[11]

These traditionally designed surveys are very useful for identifying general areas of satisfaction and dissatisfaction with Navy life. However, they are not as useful for measuring the tradeoffs with which this study is concerned. For example, importance ratings are subjective, so the difference between "important" and "very important" is not the same for all respondents. In addition, ratings are unconstrained, so it is possible for people to rate all items within a survey as important or very significant. Rankings can provide better measures of relative preferences but don't typically provide a useful scaling metric. So, it isn't clear if the item ranked number 1 is slightly more or much more preferred than the item ranked number 2. Finally, survey questions

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9. See [11], which uses QOL data from DMDC and NPRST, and [12, 13], which use DMDC data only.

10. This type of question appears on the DMDC's QOL survey and the Navy Retention/Separation Survey.

11. This type of question appears on the Navy Homebasing Survey and the 1999 Navy Personnel Pay Survey.

that have asked Sailors to indicate their willingness to react to, or express preference over, different bundles have typically not been structured to collect data that can be analyzed in any other form than by tabulation.[12]

CBC output

Quantifying tradeoffs

In contrast to the preference-based questions described above, CBC questions require respondents to choose among two or more options that vary along several dimensions, much as they do when making real decisions in the marketplace. Given this structure, CBC questions require respondents to decide how to trade off the fact that one option is better than the others on one dimension, but worse than the others on another dimension. To see the difference between the two types of questions more clearly, consider the contrast between asking whether price is an important consideration when buying a car and asking whether one prefers a $20,000 convertible to a $16,000 sedan. The answer to the former question is clearly yes, but the answer to the latter question is not obvious, a priori, because it depends not only on whether people prefer convertibles to sedans, but also on the strength of that preference.

Another way to see the difference between CBC's choice tasks and ranking or rating types of questions is that, in most applications, it would be impossible for respondents to individually rank all options. For example, as described in the next main section, our survey asks about 13 Navy job characteristics, each of which can take on 4 possible levels.[13] To come up with a complete ranking for all combinations of characteristics and levels, a person would have to sort through 13^4, or 28,561, choices. In contrast, CBC surveys are designed so that meaningful statistical analyses can be done based on respondents'

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12. For studies addressing items included in our survey, we will make direct comparisons later in the report.

13. One characteristic is increases in basic pay ranging from 0 to 10 percent (see table 2).

choices among selected subsets of all the possible combinations of characteristics and their levels.[14]

Using choice rather than rating questions has two additional benefits. First, by requiring respondents to make discrete choices among different survey options, CBC surveys present respondents with realistically framed questions that better mimic real decision processes than do rating or ranking exercises. This is especially true when the choice tasks include a "none" option, which is something that can't be done with most other survey methodologies. Focusing on tradeoffs also helps to frame survey responses in the proper context for making policy decisions. The implicit assumption underlying the CBC structure is that tradeoffs are necessary because of either budgetary or technological constraints: it is not possible to have more of one thing without giving up some of another. In marketing applications of CBC, the basic idea is that a consumer must pay more to get better features that cost more to provide. In analysis of the NSRQOS data, the relevant constraint is the Navy budget. Specifically, the Navy is looking for information that will help to identify the most valued and potentially most cost-effective QOS programs among a variety of possibilities.

The second benefit of choice-based questions is that they generate data with a structure that allows the researcher to actually measure how respondents make tradeoffs among various levels of the different job or product characteristics within the survey, as well as to estimate reenlist/don't-reenlist threshold levels.[15] Quantifying tradeoffs in this manner allows preferences for all the survey items to be quantified using one, internally consistent metric. In general, comparisons can be made in terms of each attribute level's effect on the estimated likelihood of choosing a particular option. In this study, for each QOS

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14. See [14] for a detailed discussion of the experimental designs underlying the CBC-type surveys.

15. More specifically, the CBC method of preference elicitation is consistent with random utility theory (RUT) from economics, which is based on the assumption that a person faced with choices will choose the activity that yields the greatest expected utility. Consistency with RUT means that CBC data can be used in regression analysis without the imposition of any ad hoc assumptions made by researchers.

change, we calculate the change in basic pay that yields the same change in the predicted reenlistment rate. These estimated changes in basic pay represent the implied monetary values of every QOS item in the survey.[16]

Not predicting future reenlistment rates

Although we base our analysis on comparing changes in predicted reenlistment rates, or reenlistment intentions, we do not attempt to forecast future reenlistment rates under any particular scenario. Nor do we expect our model to predict rates that reflect current reality. Reference [14] explains why quite clearly:

> The data collected in SP choice studies do not (and generally, cannot) reflect the aggregate shares of the existing market. This point seems to elude choice modelers who have worked with RP data in the past. RP data automatically reflect the aggregate state of the market. However, SP data do not reflect RP aggregate market shares because SP data reflect (by designed intent) as many markets as choice sets presented to respondents. Some of these hypothetical markets may be similar (or even identical) to the existing RP market, but the SP model parameters are estimated from all the hypothetical markets defined by the experimental design.

This issue is especially relevant for the analysis and interpretation of the NSRQOS data because most of the survey items represent significant hypothetical improvements in job and work conditions, such as increases in pay and assignment guarantees.[17]

If SP data don't reflect RP shares, what is the relationship between the two types of data? We answer this question in the next subsection.

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16. In other applications, this approach is referred to as calculating respondents' willingness to pay for product improvements. See [15] and [16].

17. For more on this issue, see the discussion about calibrating our CBC model in the Survey Results section of this report.

The link between stated preferences and revealed preferences

A general framework

RP data allow us to estimate the effects of different variables on Sailors' actual reenlistment behavior. In contrast, with SP data, we are estimating the effects of different variables on Sailors' reenlistment *intentions*. According to [17], stated intentions can be thought of as individuals' forecasts of their own future behavior. More specifically, [17] states that:

> an intention represents an individual's attempt to summarize the influences of a number of factors that may affect his behavior. These factors include the available alternatives, his own preferences, his abilities, the obstacles that must be overcome in order to perform the behavior, the opinions of other people important to him, and any other factors upon which his behavior is contingent.[18]

Based on this characterization, a Sailor's reenlistment intentions, denoted RI, can be modeled as a function of three types of factors, according to equation 1. The first type of factor is the Sailor's individual characteristics at the time of the survey, X_i^{t-n}. By definition, the intentions are given before an actual decision is made, so the individual characteristics, as well as the intentions themselves, are identified by the time superscript, t-n, which indicates that the survey is taken n periods before the actual choice is made at time t. The second set of factors includes the characteristics of the choices as defined in the survey, Y. The third factor is a random error component, ε_i.

$$RI_i^{t-n} = f(X_i^{t-n}, Y) + \varepsilon_i \ .$$

(1)

This intentions model looks very similar to an econometric model of actual reenlistment behavior, RB, which we usually specify as a function of individual characteristics at the time of the choice, X_i^t, actual job characteristics, Z, and a random error component, μ_i:

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18. In the section on Survey Results, we show data on respondents' explicitly stated plans for reenlistment as well as the reenlistment rates predicted by the model.

$$RB^t_i = g(X^t_i, Z) + \mu_i \quad . \tag{2}$$

Given these two equations, models based on RP data and SP data can yield different predicted reenlistment rates for a variety of reasons. First is timing. Things can change between the time of the survey and the time of the decision. If a person gets married or has children, his or her X vector would change. Tastes and other unmeasured conditions may also change over time, which means that μ_i and ε_i might be different. For example, the war and the economic downturn are likely to have caused changes in attitudes toward reenlistment.

There may also be differences in the Y and Z vectors. Y will be incomplete if it's not possible to formulate all relevant features into the discrete levels used in CBC tasks, or if completeness requires too many features for tractable survey design. Similarly, Z will be incomplete if available administrative data don't include all the variables of interest. Thus, models based on both data sources are subject to left-out variable bias.[19]

It may also be the case that people make choices in surveys using a different mechanism from the one they use for actual reenlistment decisions. If survey respondents don't complete the questions thoughtfully or honestly, the choice mechanisms (i.e., f and g) will be different, as will be μ_i and ε_i. In addition, even when respondents are completing their surveys conscientiously, they may overestimate or underestimate their reenlistment responses to certain job factors because survey responses don't entail real costs. For example, it's much easier to pick "will not reenlist" on a survey than to make the actual transition, which requires finding alternate employment and potentially new housing.

Given the framework described above, RP and SP data will yield more similar predictions of behavior when more of the following conditions hold:

- The time between taking the survey and making the decision is short, so that n is small

19. Both data types are also subject to measurement error of variables for which data do exist.

- The data sets contain similar variables describing the attributes of the choice (i.e., the Y and Z vectors are close)

- The respondents are knowledgeable about the survey topic and the choice has relevance so that f and g are well defined

- There is no particular incentive to answer the survey questions dishonestly

- Outside considerations, such as other people's opinions and budget constraints, play minimal roles in the choice.

Focus on relative effects

Of course, the fundamental assumption in using CBC data and models to evaluate the potential effects of policy changes is that the functions, f and g, are sufficiently similar that the estimated effect of a policy change on reenlistment intentions closely approximates the effect of that policy change on future reenlistment behavior. More specifically, by measuring relative preferences for QOS factors in terms of their pay equivalents, we are making one of two assumptions. The first, and more strict, is that, if respondents miscalculate their reenlistment responses to the survey items, they do so consistently across *all* job factors in the survey. The second, and less strict, is that respondents misestimate their sensitivity to pay *relative* to other job characteristics, but estimate their *relative* responsiveness across other characteristics consistently. For example, if people overestimate their sensitivity to pay relative to other job characteristics, but misestimate their responsiveness to the other characteristics consistently, our pay-equivalents underestimate the value of the non-pay-related job characteristics. We consider the second assumption because several marketing applications of CBC have shown that it is not unusual for CBC data to yield higher-than-expected estimates of price elasticities (e.g., see [18]). Analysis of the survey data will guide our choice of assumptions when interpreting our results.

In practice, is it reasonable to assume that changes in choice characteristics affect intentions and behavior in the same way? According to [14], the answer to this question has been yes, in applications as diverse as consumer product marketing, transportation, home mortgages, and tourism. Studies in all these areas have exploited the

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availability of compatible SP and RP data sets[20] to test whether the estimated effects of a given attribute on choice are proportional across data sources. Unfortunately, we cannot apply the test used in these studies to determine the validity of the data from the NSRQOS because there is no "compatible" RP data set available for comparison. However, the fact that there have been "few serious rejections" [14] of the tests in a wide range of applications is a positive indicator that the CBC approach is reasonable for analyzing the effects of changes in job characteristics on reenlistment intentions.[21]

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20. In this context, "compatible" means that the two data sets include the same dependent and independent variables (i.e., the choices are the same, and Y and Z are the same).

21. More specifically, these studies have tested the following condition proposed in [14]: If SP and RP market preferences are the same, the estimated parameters of the different choice characteristics from the two sources should be proportional, and the constant of proportionality should be equal to the ratio of the variances of the unexplained part of the model, that is, the variances of μ_i and ε_i. This condition is used to define the notion of "regularity of preferences" and can be generalized to be applied to any two data sources that were generated using different preference elicitation methods. See [14] for a detailed description of the statistical test for preference regularity.

The survey instrument

Pay and nonpay factors included in the NSRQOS

Thirteen job characteristics

The NSRQOS elicits respondents' preferences for 13 characteristics of a Navy job, which fall into 3 categories:

- Pays, benefits, and incentives
- Quality of service (QOS)
- Quality of life (QOL).

The first category includes increases in basic pay, sea pay, and the SRB multiplier. It also includes changes in the payment scheme for the SRB and limits on the Navy's match to individual contributions to the Thrift Savings Plan (TSP). The final attribute in this category is the obligation length for the Sailor's second term of service. Characteristics in the second category relate to QOS. This category has four attributes: assignment guarantees following reenlistment, the amount of time spent doing interesting work that uses and develops acquired skills, changes in a Sailor's expected date of promotion, and changes in the restrictions on when a Sailor can initiate contact with a Detailer to begin discussing options for the next assignment (i.e., how many months before the projected rotation date (PRD)). The third category, QOL, has three attributes: guaranteed time for voluntary education, improvements in shipboard living quarters, and various in-port housing options for Sailors on sea duty.

Each job characteristic can take on four different values. Some reflect a range of numerical levels (e.g., percentage increases in basic pay from 0 to 10 percent). Other values represent discrete, nonnumerical options (e.g., no change in shipboard living space versus increases in locker space, recreational space, or berthing space). The job characteristics and their values are summarized in table 2.

Table 2. Pay and nonpay factors included in the survey

Characteristic	Levels			
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT				
Increase in basic pay	No basic pay increase	3% basic pay increase	6% basic pay increase	10% basic pay increase
Increase in SRB multiplier	No increase	1/2-point increase	1-point increase	2-point increase
SRB payment method	Entire SRB paid in annual install-ments	50% SRB paid up front, remain-der in annual installments	75% SRB paid up front, remain-der in annual installments	Entire SRB paid up front
Increase in monthly sea pay	No increase in sea pay	$50 per month	$125 per month	$200 per month
Limit on Navy match to indi-vidual TSP contributions	No match	Up to 3% of basic pay	Up to 5% of basic pay	Up to 7% of basic pay
Obligation length for second term	1-year obligation	3-year obligation	5-year obligation	6-year obligation
QUALITY OF SERVICE				
Assignment guarantees fol-lowing reenlistment	No assignment guarantee	Location guaran-tee for next assignment	Duty guarantee for next assign-ment	Location & duty guarantee for next assignment
Time spent doing interest-ing work that uses skills	30% of the time	50% of the time	75% of the time	95% of the time
Change in expected promo-tion date	Get promoted 6 months later than expected	Get promoted on expected date	Get promoted 6 months sooner than expected	Get promoted 12 months sooner than expected
Restrictions on initial con-tact with a Detailer to dis-cuss billet options	6 months before PRD	9 months before PRD	12 months before PRD	18 months before PRD
QUALITY OF LIFE				
Guaranteed time for volun-tary education classes and study	No guaranteed time	3 hours per workweek	6 hours per workweek	10 hours per work-week
Changes in the size of ship-board living space	No change	Increased stor-age and locker space	Increased recre-ational space	Increased berthing space
In-port housing during sea duty	Live on ship	Live in 3- to 4-person barracks	Live in 1- to 2-person barracks	Get BAH and live in civilian housing

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How were the job characteristics chosen?

The first guideline for choosing job characteristics came from the definition of quality of service. According to the CNO [2]:

> Quality of service is a balanced combination of quality of life and quality of work. Although we are seeing great improvements in quality of life, this has not been the case for quality of work. Quality of work includes everything that makes your workplace a great place to be - from getting the spare parts you need in a timely manner to working spaces that are up to current standards. Quality of service includes having a work environment that contributes to personal and professional growth.

The second guideline was dictated by the study question itself—to study tradeoffs between compensation-based and non-compensation-based job characteristics. Clearly, to answer this question, the survey had to include some attributes in each category.

To develop the complete list of attributes or characteristics, we used several sources. We began by looking at current and past survey results to learn what Sailors like and don't like about naval service. Our first source was [19], which reports results from the Argus Career Milestone Tracking System from January through August 2001. According to [19], the top five reasons given by Zone A Sailors[22] for staying in the Navy were (1) medical benefits, (2) education benefits, (3) dental benefits, (4) amount of leave, and (5) satisfaction with current job. For the same group, the top five reasons for leaving the Navy were (1) amount of pay, (2) recognition for job accomplishments, (3) unit morale, (4) satisfaction with current job, and (5) promotion opportunities.[23]

We also referred to results from CNA-conducted focus groups on the reasons for fleet attrition. According to [20], focus groups indicated that Sailors attrite for many reasons, including, but not limited to, low

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22. The target audience for the survey was Zone A Sailors approaching the ends of their first terms. For more information on how the target group was chosen, see the discussion on sample selection in the next section.

23. These results are based on a sample of 4,078 Zone A Sailors.

pay, slow promotions, limited access to training and voluntary education, the low quality of shipboard life, unresponsiveness of the assignment system, and not being allowed to do the jobs for which they were trained. Although this study addresses the effects of job characteristics on *reenlistment*, we considered reasons for *attrition* important because Sailors who have similar complaints about naval service, but don't attrite, are probably less likely to reenlist.

Next, we consulted N1 and staff from the Center for Career Development (CCD) to learn what types of incentives and QOS/QOL improvements policy-makers were considering implementing. This input served two purposes. The first was to ensure that the programs and incentives included in the study would have policy relevance for the sponsor. The second was to ensure that the programs described in the survey were within the realm of possibility. Keeping the options realistic minimizes the likelihood that Sailors who take the survey develop unrealistic expectations for the future, and helps to maintain the credibility of the survey, thus improving the quality of the data. To get input from Navy staffs, we used meetings and conference calls to collect initial suggestions; then we distributed iterations of the attribute list as it developed.

Finally, technical considerations were also important. We wanted to keep the number of levels constant across attributes, which meant that we didn't include any two-level attributes, such as programs that would be described as "available" versus "not available." In addition, we took particular care to express attribute levels in concrete terms that would have roughly the same meaning for all respondents.

The hybrid survey design

The process just described generated more than 20 job characteristics that could have been included in the study. Currently, there is not complete agreement among researchers regarding the maximum number of attributes that can be included in a CBC survey. Reference [21] states that the number of attributes is limited by the human ability to process information, and suggests that options with more than six attributes are likely to confuse respondents. More generally, [14] indicates that the survey results may be less reliable statistically if the

survey becomes too complex.[24] However, [14] also indicates that some very complicated survey designs have been quite successful in practice.

The relationship between the quality of data collected with a CBC survey and the complexity of the tasks within it makes it necessary to make tradeoffs between accommodating respondents' cognitive abilities to complete the tasks versus creating accurate representations of reality and collecting enough information to generate statistically meaningful results. In particular, one of the main problems associated with including a large number of attributes is that it may become necessary for respondents to adopt simplification heuristics to complete the choice tasks, which may lead to noisier data.[25] Thus, in our application, the primary issue was including enough attributes to fully capture the important determinants of quality of service in the Navy, without overwhelming respondents with too many job factors.

We used two strategies to address this potential problem and to minimize its effects. First, we chose as our target respondent population Sailors who were nearing their first actual reenlistment decisions, and were thus likely to have fairly well developed preferences regarding different aspects of Navy life. Second, we developed a three-part hybrid survey design with one section in which respondents were asked to provide explicit preference ratings for the survey attributes and two sections in which they were asked to make discrete choices among options with different combinations of survey attributes and attribute levels.

Next, we describe each section and its purpose. Each description includes a sample survey task.

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24. In this context, complexity refers to not only the number of attributes in each option, but the number of options in each question, as well as the total number of questions.

25. If respondents focus on only a few of the survey attributes to make their choices, it is possible that the statistical model will overestimate the utility values of attributes that are actually being ignored. Reference [22], however, indicates that this type of simplification also occurs in the marketplace. If so, simplification in conjoint may not be misleading.

Survey section 1: Rating and importance tasks

In the first section of the survey, respondents were instructed to rate each job characteristic, and then indicate how important getting their most preferred levels would be in making their reenlistment decisions. The primary purpose of this section was to ease respondents into the more complex choice tasks in sections 2 and 3 by introducing them to all 13 attributes and all 52 attribute levels, and by helping them begin to frame reliable tradeoff strategies. Given this introductory role, data from responses to tasks in this section were not used to estimate any of the effects of the different attributes on reenlistment intentions.[26] A sample task from section 1 is shown in figure 1.

Figure 1. Sample task—Self-explicated utility and importance ratings

Q9: Change in Expected Promotion Date After Reenlistment

How much do you like or dislike each of the following promotion schedules? (Check 1 box for each item)	☹ 1	- 2	- 3	- 4	☺ 5	- 6	- 7	- 8	☺ 9
Get promoted 6 months **later** than expected	□	□	□	□	□	□	□	□	□
Get promoted on expected date	□	□	□	□	□	□	□	□	□
Get promoted 6 months **sooner** than expected	□	□	□	□	□	□	□	□	□
Get promoted 12 months **sooner** than expected	□	□	□	□	□	□	□	□	□

Considering the promotion schedules you just rated, how important is it to get the best one instead of the worst one?	Not Very Important						Extremely Important		
	□	□	□	□	□	□	□	□	□

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26. We did test different modeling approaches in which data from this section were used to estimate the effects of the different attributes on reenlistment intentions. We found that techniques in which these data were included did not yield better results than techniques in which they were not used. See [23] for a more detailed discussion of this issue.

Survey section 2: Partial-profile questions with no "none" option

Section 2 of the survey is the first of the two choice sections. Each of the 15 tasks in this section included 4 concepts, and each concept was defined by a different combination of only 4 of the 13 attributes.[27] These partial-profile tasks did not include a "none" option. A sample task is shown in figure 2.

Figure 2.   Sample task—partial profile choice task, without none

Q1: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
1-point increase in SRB multiplier	No increase in SRB multiplier	2-point increase in SRB multiplier	½-point increase in SRB multiplier
$50-per-month increase in sea pay	$125-per-month increase in sea pay	$50-per-month increase in sea pay	No increase in sea pay
Match TSP up to 3% of basic pay	Match TSP up to 5% of basic pay	Match TSP up to 7% of basic pay	No TSP match
Location and duty type guarantees for next assignment	Location guarantee for next assignment	No location or duty guarantee for next assignment	Duty type guarantee for next assignment

The partial profile choice tasks were included in the survey to address the possibility that responses to full-profile tasks might not yield stable parameter estimates for all 52 attribute levels. Partial-profile tasks impose a lighter information-processing burden on respondents, which reduces the likelihood that simplification heuristics will be adopted. An additional benefit is that including only a few attributes allows the concepts to be more clearly displayed on the computer screen, which is also expected to improve the quality of the responses.

Data from responses to the partial profile tasks were used to estimate the individual effects of all 52 attribute levels on predicted reenlistment rates, or reenlistment intentions. The partial-profile approach to estimating the effects of attribute levels on choice was proposed

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27. For every respondent, each level of each of the 13 attributes appeared at least once during the completion of the 15 tasks in this section.

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and tested in [24], which found that responses to choice tasks were more consistent and parameter estimates more stable using partial-profile questions than using full-profile questions. (The estimation process is described in more detail below; also see appendix E and [23].)

Survey section 3: Nearly full-profile questions with "none" option

The third section of the survey is the second of the two choice sections. The tasks in this section are nearly full-profile: each concept in each question included various levels for the same set of 11 of the 13 attributes. Thus, each concept represented a specific hypothetical reenlistment package. Each question also included a "none" or "would not reenlist" option, but the questions varied in terms of the number of reenlistment packages from which respondents were asked to choose. The section had a total of nine questions: three had one concept plus a none option, three had two concepts plus none, and three had three concepts plus none. A sample task with two reenlistment packages is shown in figure 3.

These tasks are also referred to as calibration tasks because responses are used to estimate the "none" threshold utilities, which quantify the likelihood of choosing "will not reenlist" rather than one of the reenlistment packages presented in the task, all else constant. The fact that the reenlistment packages in this section did not include 2 of the 13 attributes means that the left-out attributes were not held constant in the estimation of the none threshold. Thus, for estimation purposes, it would have been better if these tasks had been truly full-profile. However, when we tried to plan for the fact that people might have 640x480 resolution computer monitors,[28] we decided that concepts with all 13 attributes just wouldn't be readable. We carefully deliberated which attributes to leave out by considering which might be less important and which, when left out, could most naturally be assumed to be held at the current level. We chose to drop restrictions on contacting a Detailer and changes in shipboard living space.[29]

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28. The survey was fielded via disk by mail. The fielding process is described in more detail in the next section.

29. In addition to the more general reasons already given, the Detailer attribute was dropped because it was the second of two attributes dealing with the assignment process. Shipboard living space was dropped because such changes were considered less likely to be adopted.

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Figure 3. Sample task—full-profile choice task, with none

Q2: If you were facing your next reenlistment decision and these were the only two options available to you, which would you choose, or would you not reenlist?
Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Don't Reenlist ☐
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT		
3% basic pay increase	6% basic pay increase	
1-point increase in SRB multiplier	½-point increase in SRB multiplier	
50% of SRB paid up front, remainder in annual installments	75% of SRB paid up front, remainder in annual installments	
$50-per-month increase in sea pay	No increase in sea pay	
Match TSP up to 5% of basic pay	Match TSP up to 7% of basic pay	Neither of these packages appeals to me; I would rather not reenlist for a second obligation.
3-year reenlistment obligation	5-year reenlistment obligation	
CAREER AND ASSIGNMENT PROCESS		
Location guarantee for next assignment	No location or duty guarantee for next assignment	
Spend 75% of your time using skills and training	Spend 30% of your time using skills and training	
Get promoted 6 months **sooner** than expected	Get promoted 6 months **later** than expected	
QUALITY OF LIFE		
10 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	
Live in 1- to 2-person barracks	Get BAH and live in civilian housing	

Finally, in addition to serving their respective roles described earlier, including two types of choice questions is also expected to discourage respondents from getting into a response pattern (see [22]).

Questions on demographics and Navy experience

The survey had a fourth section in which respondents were asked to give background information about themselves. The questions were designed to elicit two types of information. The first type of information was not available in Navy personnel data. Questions in this category asked respondents to explicitly state their reenlistment intentions, give assessments of their own civilian job opportunities, and indicate the relative importance of first-term experiences versus expectations for the second term in making their reenlistment decisions.

The second type of information is available in Navy personnel data, and is also especially pertinent to the analyses done in this study. Questions in this category were included because matching survey respondents to personnel data requires a social security number (SSN). Although we asked respondents to provide their SSNs, human-use restrictions required us to make SSN provision voluntary. Thus, to ensure that we had certain demographic information for all respondents—even those who didn't provide their SSNs—we collected information that duplicates what is available in personnel records. Information in this category includes age, race, gender, number of dependents, paygrade, rating, and other aspects of a Sailor's career.[30]

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30. A paper version of the complete survey is provided in appendix A.

The fielding process and the resulting sample

Fielding mechanism[31]

Although the current trend is toward surveying on the Internet or by e-mail, we chose to field the survey via disk by mail. The Navy survey experts at the Navy Personnel Research, Studies, and Technology (NPRST) Survey Operations Center advised against Internet-based delivery mechanisms because of access issues, especially for junior Sailors and Sailors on ships.

In addition to the survey disks and the return mailer for the disks, the survey packets included (a) a cover letter explaining the purpose of the survey, signed by then Assistant Deputy Chief of Naval Operations Matt Henry, (b) instructions for starting and completing the survey, and (c) a list of all 13 job characteristics and their definitions. (See appendix B for copies of the survey materials.) Following standard survey practice, we sent notification letters about 2 weeks before[32] and reminder letters about 3 weeks after mailing the survey packets.

Advance notice of the survey was also given through the media. Articles announcing that the survey would soon be mailed were published in *The Navy Times* and the *European and Pacific Stars and Stripes*, as well as on the Navy's own news Web site, Navy Newsstand. In addition to describing the purpose of the survey, each article included a quotation by Rear Admiral Gerry Hoewing on the importance of responding to it. Finally, the survey was in the field for approximately

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31. The fielding of the survey was a joint effort between CNA and the NPRST Survey Operations Center. The survey and all the survey materials were created at CNA; the duplication of the materials and the fielding of the survey (i.e., mailing and receiving) were done by NPRST.

32. Because of technical problems at the Survey Operations Center, only about 30 percent of those who received surveys got notification letters.

14 weeks: packets were mailed on 12 November 2002 and the last disks processed were received on 21 February 2003.

Sample selection

Target population

Of all enlisted personnel, our target population was Zone A Sailors approaching their first reenlistment decisions. We focused on Zone A and first reenlistments because the initial reenlistment is a major milestone in the development of a career Sailor. (This is supported by the Navy's focus of the SRB program on Zone A Sailors.) Furthermore, the Navy makes substantial training investments during Sailors' first terms, and much of this investment is lost when Sailors choose not to reenlist after their first obligations.[33] We focused on first decisions exclusively because we expected Sailors at later reenlistment points, and thus different points in their lives and careers, to have different relative preferences for pay and QOS factors.

We further narrowed the target population to include only those Sailors who were within 12 months of a first reenlistment decision. Because Sailors in this group are likely to have begun considering whether to reenlist, and thinking about what their next assignments might be like, this criterion helped to identify people who were likely to have well-defined preferences for different reenlistment incentives and QOS factors. In addition, choosing people for whom a real decision was imminent minimized the amount of time between taking the survey and making the actual choice.

Based on these criteria, according to data from the Enlisted Master Record (EMR), as of September 2002, there were about 25,000 Sailors in the target population.[34]

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33. In [25], the estimated cost of replacing a first-term Sailor in FY98 was $24,301, which includes recruiting costs, boot camp costs, and A-school or apprenticeship costs.

34. Using data from the June 2002 EMR, we identified all Zone A Sailors who had not made a previous reenlistment decision and who would reach their ends of obligated service (EAOS) between 1 September 2002 and 30 August 2003.

Sampling strategy

According to NPRST survey experts, the cost of targeting junior members of the enlisted community is that their survey response rates tend to be substantially lower than those for more senior Sailors. Specifically, NPRST staff suggested that, rather than the 27-percent average response rate for Navy-wide surveys, we should expect a response rate closer to 15 percent.[35] This expectation motivated our sample selection strategy, which is described briefly in the paragraph below, and in more detail in appendix C.

From the 25,000 Sailors in the target population, a list of 10,000 names was generated—though not completely at random. Our sampling goals were to generate a cross-section sample of Zone A Sailors thinking about their first reenlistment decisions, and to have large enough subsamples to conduct precise analyses of the preference data from specific subgroups of interest. To do this, we sampled from the target population based on a quota random sampling strategy. We oversampled from subgroups with small populations to ensure sample sizes large enough to generate statistically meaningful results. Our quota random sampling strategy called for oversampling married Sailors, both with and without children, single Sailors with children, Sailors on shore duty, and Sailors at paygrades both above and below E-4.

From the name list of 10,000, a total of 9,920 survey packets were sent out,[36] and, of those, 1,180 came back marked "return to sender."[37] Thus, a maximum of 8,740 Sailors received the survey. Throughout the paper, this group will be referred to as the sampled population (versus the target population and the sample).

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35. According to [26], response rates on Navy-wide surveys have been decreasing over time. For example, the response rates for the 1990, 1994, and 1998 Navy-wide Personnel Surveys were 52, 47, and 39 percent, respectively. The Navy-wide Personnel Survey is fielded by mail.

36. From the name list of 10,000 Sailors, 80 records could not be matched to addresses in the Navy address database.

37. It is likely that some survey packets were undeliverable because the intended recipients had already changed assignments, and the address database had not yet been updated to reflect the new addresses corresponding to these new assignments.

Sample size and the overall response rate

The response rate is the proportion of completed surveys to individuals sampled, where individuals sampled are those in the sampled population already described. To be included in our data set and counted as a completed survey, a survey disk had to have been returned by 21 February 2003, and sections one through three of the survey had to have been filled out completely. Of the 8,740 survey packets that were received by the intended respondents, 1,519 satisfied the above criteria, translating into an effective overall response rate of 17 percent.[38]

Representativeness of the sample

To use our sample to draw conclusions about the preferences of the target population, we must consider how the sample differs from the target population along important dimensions. In particular, given the sampling strategy, we did not expect our sample to be representative of the target population in terms of paygrade or marital, parental, or sea/shore status. It was also the case that response rates differed across certain demographic and Navy career characteristics. In this section, to separately identify the effects of the sampling strategy and response rate variations, we show how the sample differs from both the target population and the sampled population. We also discuss the weighting scheme used to correct for the documented differences between the sample and the target population.

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38. The total number of survey disks that were returned was actually 1,666. Of these, 147 were not readable or did not have complete data, and could not, therefore, be used in the analysis. Based on the total returned count, the response rate was nearly 20 percent. See appendix E for a description of the data-cleaning process.

Table 3. Demographic characteristics of the target population, the sampled population, and the sample

Demographic characteristic	Percentage		
	Target population	Sampled population	Sample
Gender[1]			
Male	81.6	78.3	76.8
Female	18.4	21.7	23.2
Age categories[2]			
19 to 22	45.3	39.1	29.7
23 to 26	43.0	45.8	48.6
Older than 26	11.7	15.1	21.6
Marital status[3]			
Single	76.6	52.3	41.1
Married to a non-Servicemember	18.7	38.4	48.2
Married to a Servicemember	4.8	9.4	10.7
Number of children[3]			
No children	83.8	69.5	51.5
One child	12.3	23.2	29.7
Two or more children	3.9	7.4	18.8
Race categories			
Other/unknown	5.2	5.2	0.0
American Indian or Alaska native	3.3	3.4	4.4
Asian	3.1	2.9	6.6
African American	22.8	24.0	19.1
Native Hawaiian/Pacific Islander	3.8	4.0	2.7
White	61.8	60.5	67.2
Ethnicity			
Hispanic or Latino	14.1	14.5	16.4
Not Hispanic or Latino	85.9	85.5	83.6

[1]The difference in the gender mix between the target population and the sampled population does not represent deliberate oversampling of women. It is the random result of nondelivery of survey packets.

[2]We did not explicitly oversample older Sailors. However, because older Sailors are more likely to be married, have children, and be in higher paygrades, differences in the age distribution of the target population and the sampled population reflect oversampling by paygrade and marital status.

[3]Married Sailors and Sailors with children were intentionally oversampled.

The sample vs. the target population and the sampled population[39]

We begin with demographic characteristics. Table 3 shows how the sample compares with the both the target population and the sampled population along specific demographic dimensions. The data show that the survey respondents are older, more likely to be married, and more likely to have children than are members of the target population. These differences reflect both the sampling strategy and differences in response rates by demographic characteristics. For example, the difference between single Sailors' share of the sampled population and their share of the target population reflects the fact that we substantially undersampled single Sailors and oversampled married Sailors. And, comparing single Sailors' share of the sample to their share of the sampled population shows that, in addition to being undersampled, single Sailors were also less likely to respond. As a result, the respondents in our sample are substantially less likely to be single than are Sailors in the target population. The same scenario applies to Sailors with no dependent children: undersampling and lower-than-average response rates made this group underrepresented in the sample.

The difference in the age distribution of the target population and the sampled population is not the result of deliberate oversampling. Instead, because older Sailors are more likely to be married, have children, and be in higher paygrades, that difference reflects oversampling by paygrade and marital and parental status. Finally, the fact that the sample is slightly more likely than the population to be female, white, and Hispanic reflects the fact that these groups had somewhat higher response rates than members of the other groups in the relevant categories.

Next, consider Navy career characteristics. Table 4 shows how the sample compares with both the target population and the sampled population according to the characteristics for which we collected data. Comparing the paygrade distributions of the target population

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39. For the target population and the sampled population, the data in this section come from the EMR; for the sample, the data come from respondents' answers to the demographic questions in section 4 of the survey. Of the 1,519 respondents who completed sections 1 through 3 of the survey, only 1,509 gave complete responses to section 4.

Table 4. Navy career profiles for the target population, the sampled population, and the sample

Navy career characteristic	Target population (%)			Sampled population (%)			Sample (%)		
	Sea	Shore	All	Sea	Shore	All	Sea	Shore	All
Paygrade[1]									
E-3 or below	13.5	18.9	14.7	25.9	25.9	25.9	9.3	9.8	9.4
E-4	59.7	58.2	59.4	40.9	47.5	42.7	37.4	47.8	40.4
E-5 or above	26.8	22.9	25.9	33.2	26.6	31.4	53.3	42.4	50.2
Time to EAOS									
Within 3 months	8.6	12.6	9.5	7.4	10.4	8.2	17.1	22.6	18.7
Within 6 months	14.4	17.0	15.0	14.8	18.0	15.6	30.9	26.4	29.6
Within 12 months	58.9	49.5	56.8	59.2	52.3	57.4	35.4	31.2	34.2
Longer than 12 months	18.1	20.9	18.7	18.6	19.3	18.8	16.6	19.8	17.5
SRB eligibility[2]									
Qualify for SRB	54.7	41.0	51.8	54.0	38.5	49.9	55.5	43.7	52.2
Don't qualify for SRB	45.3	59.0	48.2	46.0	61.5	50.1	44.5	56.3	47.8
Rating[3]									
AD	3.9	1.7	3.4	4.1	1.3	3.4	4.0	1.4	3.3
AM	4.2	1.4	3.6	5.1	1.5	4.2	3.7	0.5	2.8
AO	3.4	1.3	2.9	3.0	1.3	2.6	2.9	0.7	2.3
AT	5.8	3.4	5.2	5.7	2.9	4.9	5.9	1.4	4.6
EM	4.4	1.3	3.7	3.6	1.0	2.9	4.2	1.4	3.4
ET	3.0	3.2	3.0	3.4	3.3	3.4	3.8	4.7	4.0
HM	3.1	24.2	7.8	4.3	25.2	9.9	5.8	25.6	11.5
MM	5.2	1.6	4.4	4.4	1.3	3.6	4.2	0.9	3.3
OS	4.4	2.6	4.0	3.6	2.0	3.2	3.6	1.2	2.9
RM	3.7	5.5	4.1	3.1	5.5	3.7	0.0	0.0	0.0
Total	77.7	22.3	100.0	73.5	26.5	100.0	70.5	29.5	100.0

[1]Paygrades above and below E-4 were oversampled.
[2]For the sample, respondents who didn't know whether they were SRB eligible were included with those who weren't.
[3]These are the top 10 ratings in terms of size from the target population; table percentages do not add to 100.

and the sampled population shows the extent to which we undersampled E-4 Sailors. And, comparing the paygrade distributions of the sampled population and the sample reflects the fact that junior Sailors had lower response rates than their more senior counterparts.

None of the other career characteristics—time to EAOS, SRB eligibility, or rating—were considered in creating our sampling scheme, which is reflected in the similarity between the target population and the sampled population. Comparing the sample to the sampled population shows that response rates did differ by time to EAOS and SRB eligibility.

Weighting the sample

Given that the sample is indeed different from the target population, it is necessary to weight the sample across observations so that the estimated impact of different cells becomes reflective of the target population. To do this, we used a two-part weight that separately accounts for demographic differences due to the sampling process and demographic differences due to response rate variations by individual characteristics.[40] The weights are constructed for 36 demographic cells defined by the paygrade and marital, parental, and duty status categories used to create the name list[41] plus one additional refinement. Because of substantial differences in response rates for Sailors married to Servicemembers and those married non-Servicemembers, we looked at three marital status categories instead of two: single, married to a non-Servicemember, and married to a Servicemember. Unless otherwise noted, results reported in this paper are based on weighted samples.

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40. The weighting procedure follows the methodology outlined in [27, 28, and 29]. We discuss it in greater detail in appendix D.

41. Weighting by these characteristics will also correct for differences in the age distributions of the sample and the target population.

Sample selection/response bias[42]

A survey data set suffers from sample selection or response bias if certain groups of individuals within the sampled population have an unknown probability of being survey respondents *and* their preferences differ from those who do not respond. The weighting process just discussed corrects for differences between sample and population shares only for groups defined according to the *observed* characteristics used to define the weights. It does not correct for the response bias that arises when those who voluntarily respond to a survey have systematically different preferences, or responses, than those who choose not to respond, all other *observed* characteristics aside.

For example, it is typical to respond to a survey because of strong feelings about the survey topic; these strong feelings may be positive or negative. In the context of the NSRQOS, it is possible that Sailors who responded to the survey were using it as a means to register votes of dissatisfaction with Navy life. It is also possible, however, that Sailors who took the time to complete the survey did so out of commitment to the Navy and the desire to help "Navy planners identify new policies and programs that will make Naval service more satisfying and rewarding," as suggested in the survey cover letter. Because we don't have information on the preferences of nonrespondents, we are unable to sign this bias. Thus, the direction of response bias in terms of stated reenlistment intentions is unclear.

Another potential form of response bias for the NSRQOS is related to the fielding mechanism. Specifically, given that the survey was to be completed on a computer disk, some Sailors may not have responded because of lack of access to a computer or discomfort with using one. And, if people who use computers have different preferences from those who don't, the survey results could be biased. To minimize the

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42. Lack of response takes two forms: not returning the survey and not responding to an item. Our sample includes only those respondents who completed the self-explicated and two choice-based conjoint sections of the survey, so we are treating item nonresponse as being equivalent to survey nonresponse.

potential for this type of nonresponse bias, we gave people the option to request a paper survey: only 50 respondents did so, and only 13 of the 50 returned completed surveys.[43] Although we can't determine the extent of response rate bias due to the type of delivery mechanism, the fact that fewer than 1 percent of survey recipients requested a paper survey indicates that there was not a large group of Sailors who really wanted to complete the survey, but didn't do so because of lack of computer access or skill.

Reference [30] suggests that surveys with low response rates are more likely to suffer from response bias than surveys with high response rates. According to [30], the expected response rate for a mailed survey is typically less than 50 percent, and ours—at 17 percent—is substantially lower. Therefore, the response rate for this survey may qualify as low, and our estimates of relative preferences may be subject to response rate bias.

Understanding the potential for response/nonresponse bias is important for determining the extent to which a survey's results are generalizable to the whole population of interest. Any voluntarily completed survey is subject to some form of response bias. The above discussion indicates that NSRQOS results may not be generalizable to the whole first-term enlisted population if Sailors who have access to and use computers have different preferences from those who don't, or if the relatively low response rate is reflective of some systematic response pattern that is also related to preferences for QOS factors.

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43. As a result of the limited number of paper surveys and the extra cost associated with processing the data from them, we did not include these responses in our analysis.

Explicitly stated reenlistment intentions

Explicit vs. implicit intentions

As noted in the section describing the survey design, we asked several direct questions about respondents' plans for the future. These questions represent an alternative way to elicit information about Sailors' reenlistment intentions.

First, we asked respondents to indicate their current plans for reenlistment by choosing one of the following:

- I plan to reenlist.

- I do not plan to reenlist.

- I plan to enter into a long-term extension of my contract.

- I have not made my reenlistment decision yet.

Next, we asked respondents to indicate whether experiences during their first obligations or expectations for their next obligations had or would play a more significant role in their reenlistment decisions.

Having asked about future plans, we then asked two questions designed to elicit information about respondents' own assessments of their civilian opportunities. Specifically, we asked respondents to indicate how strongly they agreed with the following statements:

- The Navy is my best current career choice.

- It would be easy to find a civilian job that compensates (pay and benefits) as well as my Navy job.

Respondents indicated their level of agreement with these statements according to the following five-point scale: Strongly agree, Agree, Neither agree nor disagree, Disagree, or Strongly disagree.

The data presented in this section summarize responses to these questions for the full sample and by certain demographic and Navy career characteristics, such as marital status, paygrade, and eligibility for the SRB. These data are different from the data generated by the choice tasks in sections 2 and 3 of the survey because responding to explicit questions and responding to choice tasks are cognitively different processes. We present data on explicitly stated intentions as background to the choice data.

Reenlistment intentions vs. actual reenlistment rates

Overall, the survey respondents' explicit reenlistment intentions were spread fairly evenly across three options: 37 percent of the respondents indicated that they planned to reenlist or enter a long-term extension at their next decision point, 32 percent responded that they would not reenlist, and 31 percent indicated that they remained undecided. This pattern is similar to those reported in other studies.[44]

Several studies have compared stated intentions with actual later behavior to gauge whether intentions are good predictors of future reenlistment rates. Overall, the evidence on whether stated intentions are good predictors of actual behavior is conflicting (see [32] and [33]); however, a recent study based on the QOL survey [12] notes that a majority of Sailors who stated an intention to reenlist or were unsure about their reenlistment intentions did continue in the Navy. Unfortunately, we cannot do a complete comparison of stated intentions to actual behavior for two reasons. First, of the 1,519

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44. Of first-term Sailors who responded to the 1998 Navy Personnel Pay Survey, 22 percent stated that they were likely to reenlist, 31 percent were undecided, and 47 percent were unlikely to reenlist [31]. For Sailors who responded to the 2002 Assignment Incentive Survey, 41 percent indicated an intention to reenlist, 23 percent didn't plan to reenlist, and 36 percent were not sure about their reenlistment intentions [1]. Results from the 2002 Seabee Quality-of-Service Compensation Survey, fielded only to Seabees, were that 46 percent stated an intention to reenlist, 23 percent didn't intend to reenlist, and 31 percent were unsure about their reenlistment intentions [4].

respondents whose choice data we analyze, only 978 provided social security numbers that would allow us to match their survey responses to personnel data, and thus track their behavior. Second, many of the Sailors in our sample simply had not reached decision points at the time of this writing. However, we can do a limited comparison by looking at the actual behavior of the 551 Sailors who provided their SSNs and had made reenlistment decisions as of 30 June 2003.

For people making decisions, table 5 shows the numbers in the target population, the sampled population, and the number who chose to stay in the Navy and the number who chose to leave, along with the corresponding percentages. The actual reenlistment rates for the target population and the sampled population (53 and 55 percent, respectively) are slightly lower than the overall FY01 and FY02 Zone A reenlistment rates that were reported in table 1, but are still higher than rates from the 1990s. At 69 percent, however, the reenlistment rate for the sample is substantially higher than both historical rates and the current rates for both the target and sampled populations.

Table 5.   Actual reenlistment behavior of people who had made reenlistment decisions as of 31 March 2003

Actual reenlistment decision	Counts			Rates (percentages)		
	Target population	Sampled population	Sample[1]	Target population	Sampled population	Sample[1]
Reenlist or extend[2]	7,125	2,629	379	52.5	55.3	68.8
Leave	6,437	2,129	172	47.5	44.7	31.2
Total	13,562	4,758	551	100.0	100.0	100.0

[1]Decision data were available only for the 347 survey respondents who voluntarily provided their social security numbers and who had reached a decision point by 31 March 2003.
[2]Extending is entering into an unconditional, long-term extension.

There are two possible explanations for the difference between reenlistment rates for the sample and the sampled population: people who responded to the survey may be different from those who did not respond, or people who provided SSNs may be different from those who did not provide them.[45] Although we have no way to test the first hypothesis, we can test the second by comparing the stated reenlistment intentions of respondents who did and did not provide their

SSNs. Specifically, if people who knew they weren't going to reenlist were less likely to give their SSNs, the observed reenlistment rate for the sample would be higher than that of the sampled population. Furthermore, assuming that people who knew they weren't going to reenlist indicated this intention on the survey, people who did not provide SSNs should be less likely to state that they intended to reenlist. In fact, we find that respondents who did not provide SSNs were 32 percent more likely to say that they did not plan to reenlist.[46] Thus, at least part of the difference between reenlistment rates for the sample and the sampled population probably results from differences between the behavior of those who did and did not provide SSNs. However, we do not know whether all of the difference in rates can be attributed to SSN provision or whether there is also overall response bias.

Whether our sample's stated intentions will overestimate or underestimate actual reenlistment rates depends on how likely people are to act on their intentions and on how those in the undecided group ultimately behave. To give some idea of what might be expected, consider the following mapping of intentions to behavior implied by the data presented in table 6. The data show that, for respondents who had made decisions by the 30 June cutoff date, 98 percent of those who said they would reenlist did so, 87 percent who said they would not reenlist did leave the Navy, and 75 percent of those who were undecided ultimately stayed. Applying these percentages to the intentions for our whole sample implies a reenlistment rate of about 64 percent, which falls between the actual rates for the population and the sample.

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45. In addition, it may also be the case that both of these explanations are true to some degree.

46. The difference between people who did and did not provide SSNs remains the same even when we look only at Sailors in paygrades E-4 and above to control for eligibility issues.

Table 6. Reenlistment intentions vs. decisions for people who had made reenlistment decisions as of 31 March 2003[1]

Reenlistment intention	Actual reenlistment decision (percentage)		
	Stay[2]	Leave	Total
Stay[2]	98.1	1.9	100.0
Leave	13.2	86.8	100.0
Undecided	74.6	25.4	100.0

[1]Decision data were available only for the 347 survey respondents who voluntarily provided their social security numbers and who had reached a decision point by 31 March 2003.
[2]Staying is reenlisting or entering into an unconditional, long-term extension.

Reenlistment intentions by subsample

In this subsection, we examine how explicitly stated reenlistment intentions vary by Navy career characteristics, respondents' perceived civilian opportunities, and demographic characteristics.

Navy career characteristics

Table 7 shows how reenlistment intentions vary by selected Navy career characteristics. Beginning with paygrade, the data show that Sailors who hadn't reached E-4 were much less likely than higher ranked Sailors to be planning to reenlist, and they were more likely to be undecided. This may be the result of eligibility issues—either ineligibility or uncertainty about eligibility—for lower ranked Sailors, rather than differences in preferences. In addition, Sailors who had progressed beyond E-4 were less likely to be planning to reenlist than E-4 Sailors. To the extent that the Navy's promotion process accurately identifies better performers or that Navy training is transferable to civilian jobs, this result may indicate that people in this group have better outside opportunities.[47]

Reenlistment intentions by SRB eligibility show an interesting pattern. Sailors who qualified for the SRB were 1.7 percentage points more likely to be planning to stay in the Navy than were Sailors who didn't qualify. However, they were also 5.2 percentage points more

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47. Sailors in paygrades E-5 and above were more likely than those in E-4 to indicate that it would be easy to find a comparable civilian job.

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likely to be planning to leave. Thus, the main difference in intentions between Sailors who knew they did and did not qualify for the SRB was that Sailors who didn't qualify were more likely to be undecided. Furthermore, Sailors who didn't know whether they were SRB eligible were substantially less likely to be planning to reenlist. It is likely that this result reflects the fact that a relatively high percentage of Sailors who don't know whether they are SRB-eligible are likely to be ineligible for reenlistment. [48]

Table 7. Reenlistment intentions (in percentages) by selected Navy career characteristics

Group	All	Reenlist or extend	Leave	Undecided	Total
		Reenlistment intentions			
All	--	36.9	31.8	31.3	100.0
Paygrade					
Below E-4	9.4	17.6	41.6	40.8	100.0
E-4	40.3	40.2	27.5	32.3	100.0
Above E-4	50.2	37.8	33.5	28.7	100.0
Total	100.0	--	--	--	--
SRB eligibility					
Yes	52.2	39.1	33.5	27.4	100.0
No	41.3	36.7	28.3	35.0	100.0
Don't Know	6.6	20.2	40.4	39.4	100.0
Total	100.0	--	--	--	--
Expect promotion following reenlistment					
Yes	37.7	42.1	16.9	41.0	100.0
No	62.3	33.7	40.9	25.4	100.0
Total	100.0	--	--	--	--
Sea/shore duty					
Sea	71.6	38.4	30.5	31.1	100.0
Shore	28.4	32.9	35.3	31.8	100.0
Total	100.0	--	--	--	--
Decision criterion					
Experience in 1st term	54.7	27.2	45.9	26.9	100.0
Expectations for 2nd term	45.3	48.5	14.8	36.7	100.0
Total	100.0	--	--	--	--

48. Thirty percent of the respondents who didn't know whether they were eligible for an SRB were in a paygrade below E-4, and thus likely to be ineligible for reenlistment. In contrast, only 5 (12) percent of Sailors who indicated that they were (were not) SRB-eligible were in a paygrade below E-4.

As intuition suggests, Sailors who expect to be promoted following reenlistment are more likely to say they will reenlist than those who are not expecting a promotion. The data also show that Sailors on sea duty are more likely to say they will reenlist.[49] This result may reflect Sailors' preferences for working within their assigned ratings, which is more likely to occur during sea duty,[50] or it may reflect the fact that Sailors who are currently on sea duty are headed for shore duty.

Finally, we consider how Sailors' stated reenlistment intentions vary according to whether they are making their decisions based primarily on their first-term experiences or on their expectations for the second term. The data show that Sailors whose plans are being driven by first-term experiences are much less likely to be planning to reenlist than are Sailors whose plans are being driven by expectations for the future. To better understand what this result might imply, we looked at the data from a different angle. Respondents who indicated that they would not reenlist based on their first-term experiences and who were also likely to be eligible to reenlist (i.e., were ranked E-4 or above), represent 15 percent of the whole sample. In contrast, respondents who indicated that they would not reenlist based on their expectations for their second terms and who were also likely to be eligible to reenlist, represent only 6 percent of the sample. In addition, we note that the actual reenlistment rates for respondents for whom we have decision data were 84 percent for those who indicated that their decisions were based on expectations for the future, and only 54 percent for those whose decisions were based on experience. Together, these facts indicate that there may be greater potential reenlistment gains from improving Sailors' first-term experiences than from offering more or higher incentives for the second term.

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49. Both [7] and [8] find that higher incidences of sea duty are correlated with lower reenlistment rates—pay and other factors held constant.

50. More time is spent working and doing productive work during sea duty than during shore duty, which increases the opportunity to be doing work within a rating. According to OPNAVINST 1000.16J, 8 January 1998 and 17 June 2002, the standard workweek while on sea duty is 81 hours, with 71 of those hours spent in productive work; the standard shore duty peacetime workweek is 40 hours, with 33.4 of those hours spent in productive work.

This conclusion is strengthened by the fact that Sailors who qualify for an SRB were *not* more likely to say that their reenlistment decisions would be based on expectations rather than experience.[51]

Demographic characteristics

Reenlistment intentions also vary by marital status and number of dependent children, as shown in table 8. Single Sailors and Sailors married to other Servicemembers were much less likely to say that they would reenlist than were Sailors married to non-Servicemembers. Similarly, Sailors with children, especially those with more than one child, were much more likely to say they would reenlist than were Sailors with no dependent children. These results suggest that, although separation from family may be an important issue, stability of employment for married Sailors and Sailors with children is also important.

Table 8. Reenlistment intentions (in percentages) by marital and dependent child status

Group	All	Reenlist or extend	Leave	Undecided	Total
		Reenlistment intentions			
All	--	36.9	31.8	31.3	100.0
Marital status					
Single	41.1	30.1	34.7	35.2	100.0
Married, non-Servicemember	48.1	43.2	28.5	28.3	100.0
Married, Servicemember	10.8	34.6	35.8	29.6	100.0
Total	100.0	--	--	--	--
Number of children					
No children	51.5	31.1	37.4	31.5	100.0
1 child	29.6	39.2	28.3	32.5	100.0
2 or more children	18.9	48.9	22.2	28.9	100.0
Total	100.0	--	--	--	--

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51. Fifty-three percent of respondents who knew they qualified for an SRB indicated that their reenlistment decisions would be based on their first terms, compared with 54 percent for those who knew they did not qualify for an SRB.

We also compared the relationships between intentions and behavior for married and single Sailors to learn something about how spouses' input might affect decisions. The data show that Sailors' ability to predict that they will stay Navy doesn't vary much by marital status, but their ability to predict leaving does. Specifically, 91 percent of single Sailors who indicated an intention to leave the Navy did so. In contrast, the percentage for Sailors married to non-Servicemembers is only 83 percent. This finding illustrates how outside factors break the link between intentions and behavior. It also reinforces the importance of employment stability for married Sailors.

Outside opportunities

Finally, in table 9 we present data on reenlistment intentions by Sailors' own assessments of their outside opportunities. As would be expected, respondents who agreed that the Navy was their best career option were more likely to say that they would reenlist, and those who agreed that it would be easy to find equally well paying civilian jobs were less likely to say that they would reenlist. However, intentions vary more starkly by agreement/disagreement with the statement about the Navy as a good career opportunity than the statement about competing civilian opportunities. For example, 60 percent of the respondents who said they agreed or strongly agreed that the Navy was their best career option said they would reenlist, and only 8 percent of the respondents who disagreed or strongly disagreed with the statement said they would reenlist. In contrast, only 43 percent of the respondents who agreed or strongly agreed that it would be easy to find an equally high paying civilian job indicated that they planned to leave, and as much as 17 percent who disagreed or strongly disagreed with the statement planned to leave anyway. This pattern is also reflected in the data on actual reenlistment decisions. The reenlistment rate for those who said they agreed that the Navy was their best career option was 86 percent, and the rate for those who disagreed was only 32 percent. In contrast, the reenlistment rate for those who agreed that it would be easy to find a good civilian job was as high as 62 percent and the rate for those who disagreed was even higher at 81 percent.

Table 9. Reenlistment intentions (in percentages) by outside opportunity

Group	All	Plans for reenlistment			
		Reenlist or extend	Leave	Undecided	Total
All	--	*36.9*	*31.8*	*31.3*	*100.0*
The Navy is my best current career choice					
Agree or strongly agree	*40.6*	60.2	12.8	27.0	100.0
Neither agree nor disagree	*33.4*	30.8	24.5	44.7	100.0
Disagree or strongly disagree	*26.0*	8.2	71.1	20.7	100.0
Total	*100.0*	--	--	--	--
It would be easy to find a civilian job that pays as well as my Navy job					
Agree or strongly agree	*44.9*	29.6	43.0	27.4	100.0
Neither agree nor disagree	*32.5*	38.0	26.6	35.4	100.0
Disagree or strongly disagree	*22.7*	49.6	17.3	33.1	100.0
Total	*100.0*	--	--	--	--

These results indicate that, even though the lure of high-paying civilian jobs may be strong, people's absolute feelings about their suitability to the Navy are potentially stronger. However, these data are also confounded by the high patriotism and reenlistment rates associated with the war, and the potentially fewer civilian job opportunities associated with the economic slowdown.

CBC results: The relative effects of each attribute on predicted reenlistment rates

The strength of the choice-based conjoint methodology is its ability to capture and quantify respondents' preferences for one survey item relative to any of the others. Because the primary goal of this study was to increase our understanding of how Sailors value nonpay job factors relative to pay, our presentation of the survey results compares the effects of changes in the various QOS attributes to hypothetical changes in basic pay.

The starting point for all our analyses is a predicted, baseline reenlistment rate that is intended to reflect current conditions. The next step is to change each attribute level one at a time to show the effect of each on reenlistment intentions, holding all the others constant. Then, for changes in QOS factors that have a positive effect on the predicted reenlistment rate, we calculate the percentage pay increase that would achieve the same predicted increase, all else equal. We call this pay increase the pay-equivalent value of a given attribute level. Conversely, for changes in QOS factors that have a negative effect on the predicted reenlistment rate, we calculate the accompanying percentage pay increase that would be necessary to compensate people for the change, and keep the reenlistment rate constant at the base-case level. We call this pay increase the pay-equivalent compensation level of a given attribute.

We begin the presentation of survey results by defining the base-case attribute levels and discussing how they were used to generate the baseline reenlistment rate.[52] Then, we use the CBC model to estimate Sailors' stated reenlistment responsiveness to changes in basic pay and the SRB multiplier. Because there are widely accepted estimates

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52. Detailed discussions of the estimation process and specific estimation issues are included in appendixes E and F, and in reference [23].

of these parameters from RP data, comparing the CBC model's results for pay with the RP results informs our interpretation of the results for the other survey items. Finally, we move to the primary focus of the study, which is the estimated impact on reenlistment intentions of QOS factors relative to pay.

Base-case reenlistment rates

The underlying choice model and the estimation technique

In general, the goal of the CBC method is to enable researchers to use survey responses to quantify the impact of each attribute level on the likelihood that an option with that level will be chosen over a competing option. The competing option may be defined by an alternative attribute level; it may also be defined as choosing none, or, in this case, choosing not to reenlist. Using a given survey dataset, there are several models and estimation techniques that can be used to generate the desired estimates. For this study, the underlying model of choice is the conditional logit model, and the estimation technique is hierarchical Bayes.[53]

Defining the base case

The baseline, or base-case, reenlistment rate is the predicted reenlistment rate given a set of attribute levels that was chosen to reflect "current" conditions as closely as possible. These current, or base-case, attribute levels are listed in table 10, and the rationale for each is summarized as follows:

- For attributes specified in terms of specific changes, the base-case levels are no change. Attributes in this category are increases in basic pay, the SRB multiplier, sea pay, and changes in shipboard living space.

- The base-case level for the SRB payment method reflects current policy: currently, 50 percent of the SRB is paid at the time

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53. Detailed discussions of the estimation process and specific data and estimation issues are included in appendixes E and F, and in [23]. Appendix G presents limited external validation of the survey results.

of reenlistment and the remainder is paid in annual installments.

- For the TSP match attribute, the base-case level is no matching payment. Under the 2001 law that extended the TSP to military Servicemembers,[54] the secretary of each military Service was given the authority to designate critical specialties for matching contributions. At the time of survey design and fielding, however, the Navy had not yet designated any ratings to receive matching funds.

- The base-case obligation length was set at 3 years to reflect the 3-year minimum commitment necessary to receive an SRB.

- At the time of the survey, there were no programs granting guarantees for study time, location, or duty type for the next assignments. "No guarantee" is the base-case level for these attributes.

- Time spent doing interesting work that uses and develops skills learned in training is assumed to vary across ratings and paygrades. As a middle amount, 50 percent of the workweek was designated as the base case level for this attribute.

- Promotion on the expected date was the base case level for the promotion schedule.

- In Spring 2002, Project Sail allowed Sailors to begin discussing assignments with Detailers 9 months before PRD.[55] The base-case level for the Detailer attribute reflects this policy change.

- Finally, the base-case level for in-port, sea duty housing was to receive BAH and live in civilian housing. This choice reflects the fact that 1,300 of the 1,506 respondents for whom we have demographic data are above paygrade E-4 or have dependents and, therefore, qualify for BAH.

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54. The TSP was made available to Servicemembers under a provision of the The Floyd D. Spence National Defense Authorization Act for Fiscal Year 2001 (Public Law 106-398). The first open enrollment for Servicemembers occurred in October 2001.

55. Project Sail was designed to increase communication between Detailers and Sailors (see [34] and [35]).

Table 10. Attribute levels from the survey that most closely reflect "current" conditions

Attribute	"Current" level
Increase in basic pay	No increase
Increase in SRB multiplier	No increase
SRB payment method	50% upfront
Increase in monthly sea pay	No increase
Limit on TSP match	No match
Obligation length for 2nd term	3 years
Assignment guarantees	No guarantee
Time spent using skills and training	50% of time
Change in expected promotion date	Expected date
Restrictions contacting a Detailer	9 months before PRD
Guaranteed time for voluntary education	No guaranteed time
Size of shipboard living quarters	No change
In-port, sea duty housing	Get BAH, and live in civilian housing[1]

[1] 1,300 of the 1,506 respondents for whom we have demographic data are above paygrade E-4 or have dependents and, therefore, qualify for BAH.

Calibrating the model to yield a realistic baseline reenlistment rate

As noted, data from a CBC survey aren't expected to reflect aggregate shares of the existing market;[56] therefore, the predicted reenlistment rate under the base-case scenario is not expected to match the actual observed reenlistment rate. According to [14], it is usually necessary to calibrate CBC models to produce realistic baseline market shares. This was indeed the case with the NSRQOS: the predicted reenlistment rate under the base case was unrealistically low at 7 percent. Because elasticity estimates are sensitive to the starting point, it was necessary to calibrate the model to reflect a more reasonable reenlistment rate. We chose the prevailing average rate of 58 percent.[57]

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56. See discussion on page 14.

57. This was the reenlistment rate for members of the target population who had made decisions as of 31 March 2003. Several sources indicate that the unusually high reenlistment rates during the survey period were caused by real choices by Sailors to stay, as opposed to any stop-loss measures that might have been implemented during the war. See [36] and [37].

The difference between actual reenlistment rates and the baseline predicted rate results from learning during the survey. According to [20], as they become familiar with a survey's attributes and attribute levels, "respondents quickly leave their old reference levels as they adapt to the alternatives provided" and they "learn to evaluate each alternative compared with the local competition within the choice set."[58] Within this context, note that, for 7 of the 13 job attributes, the base-case levels represent no improvement in pay or QOS conditions. However, the alternative levels for these attributes represent significant increases or improvements. Thus, by familiarizing the respondents with the attribute levels in sections 1 and 2 of the survey, we shifted their expectations regarding what would be considered a good reenlistment deal. As a result, in section 3, respondents understated their true reenlistment likelihoods for options that represented no change or only a little improvement relative to current offerings.

Finally, although we have calibrated our model to predict reasonable reenlistment rates under "current" conditions, we will still focus on relative preferences and the relative effects of policies on changes in predicted reenlistment rates. We are heeding the warning: No matter how carefully conjoint predictions are calibrated to match current market shares, "the researcher may one day be embarrassed by the differences that remain" [21].

For each attribute level, predicted reenlistment rates from the calibrated model are presented in appendix H.

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58. According to [22], this occurs because CBC tasks or questions "decontextualize judgement by shifting reference levels and changing associations. Reference levels assist in our market decisions by gauging whether a particular offering is appropriate or not, and enable us to make reasonable decisions in very little time. However, these reference levels are also quite sensitive to the competitive context. Consider the following two examples. What seems like an outrageous price can quickly become acceptable in the face of higher-priced competitive offerings. What seems like an appropriate modem becomes outmoded when compared with the faster models."

Supply responses to pay-related attributes

Supply elasticities—basic pay and the SRB multiplier

To manage the All-Volunteer Force, it was considered necessary to develop an understanding of the relationship between reenlistment behavior and military pay. Thus, there have been numerous efforts to quantify this relationship in terms of the pay elasticity of reenlistment, which measures the percentage change in the reenlistment rate caused by a 1-percent change in military pay.[59] Reference [10] summarizes the results of 13 such studies conducted during the 1980s and 1990s.[60] The studies all indicate that reenlistment behavior is responsive to changes in pay, but the estimates of the degree of responsiveness vary substantially. Specifically, the elasticity estimates range from as low as 0.4 to as high as 3.0, depending on the model used and the definition of pay.

Although people are responsive to changes in compensation, across-the-board increases in basic pay are an expensive way to increase reenlistment. Thus, the Navy created the Selective Reenlistment Bonus (SRB), a more targeted pay-based reenlistment incentive that has become the Service's primary tool for managing reenlistment and retention. Because of its importance as a force management tool, many of the studies discussed above estimate the impact of changes in the SRB multiplier along with the impact of pay.[61] The impact of these changes is measured in terms of the percentage-point change in reenlistment associated with a 1-level increase in the multiplier. These estimates also cover a broad range: from 0.4 to 5.5 for first-term reenlistments.[62]

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59. The definitions of both pay and reenlistment vary across studies. See [10] for examples of different ways to define pay and [38] for a discussion of the potential impact of choosing different definitions on estimation results.

60. See table 2 of [10].

61. For a given person, the total SRB is equal to the appropriate multiplier times monthly basic pay times the number of years committed to upon reenlistment. Multipliers range from 0 to 7, increase in half-point increments, and are assigned based on ratings.

62. See table 2 of [10] for a summary of the research on pay elasticities and SRB effects.

Reference [38] reviews the methodologies used to generate this wide range of elasticity estimates for both pay and the SRB. The authors attribute the range to differences in model specification, as opposed to changes in behavior over time. They conclude that the best estimate of pay elasticity is 1.5, which falls close to the midpoint in the range. For SRB, 2.5 percentage points is the preferred estimate.

Table 11 shows the CBC model's predicted changes in reenlistment rates due to increases in basic pay and the SRB multiplier. The data show that the supply responses to changes in both basic pay and the multiplier decrease as the increases in the awards get larger. This pattern is consistent with diminishing marginal returns.[63] Based on the reported changes in reenlistment rates, the elasticities associated with the 3-, 6-, and 10-percent basic pay increases considered in the survey, are 5.7, 4.3, and 3.0, respectively. These are high compared with the elasticities estimated using behavioral data. The CBC-estimated supply responses to increases in the SRB multiplier are also high relative to those based on RP data: for the 0.5-, 1-, and 2-level increases in the multiplier, the estimated percentage-point changes in predicted reenlistment rates are 15.7, 10.1, and 6.5, respectively.

The high elasticity values generated by the CBC model indicate that respondents may have overestimated their responsiveness to pay. According to [39], this is fairly typical in choice tasks, and is part of the task simplification process during which respondents tend to discard alternatives that have low levels on important attributes, "typically producing the appearance of strong diminishing returns." Reference [39] also says that, in choice tasks, "attributes whose impacts are immediate and concrete come to the fore compared to those that are distant or abstract." In particular, marketing researchers have found that respondents tend to overestimate their responsiveness to price relative to other attributes.

The CBC estimates of reenlistment responses to pay have implications for how we interpret the model's results for other items in the

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63. Diminishing marginal returns is an economic concept that states that additional, equal increases in income are valued less at higher levels of total income than at lower levels.

survey. NSRQOS respondents may have overestimated their responsiveness to change in pay relative to the other types of changes included in the survey. This means that our pay-equivalent values for nonpay QOS factors may be underestimating their true values.

Table 11. Predicted reenlistment rates associated with increases in basic pay and the SRB multiplier, plus the pay-equivalent value of increases in the SRB multiplier

Attribute level	Predicted reenlistment rate[a,b]	Change relative to base case		Pay elasticity[c]	SRB effect[d]	Pay-equivalent value[e]
		Percentage	Percentage point			
Basic pay						
No increase	58.1	NA	NA	NA	NA	NA
3% increase	69.1	17.2	NA	5.7	NA	NA
6% increase	75.2	25.6	NA	4.3	NA	NA
10% increase	78.3	29.6	NA	3.0	NA	NA
SRB multiplier						
No increase	58.1	NA	NA	NA	NA	NA
1/2-pt. increase	66.0	NA	12.6	NA	15.7	2.1
1-pt. increase	68.2	NA	16.0	NA	10.1	2.8
2-pt. increase	71.0	NA	20.0	NA	6.5	4.0

a. Based on the calibrated model.
b. Within attributes, all predicted reenlistment rates differ by more than +/- one standard deviation.
c. Pay elasticity is the *percentage* change in the reenlistment rate due to a 1-percent change in basic pay.
d. SRB effect is the *percentage-point* change in the reenlistment rate due to a 1-point change in the SRB multiplier.
e. Pay-equivalent value is the percentage increase in basic pay that causes the same increase in the predicted reenlistment rate as the change associated with the indicated attribute level, all else equal.

Other pay-related attributes

The three additional attributes that dealt directly with monetary compensation are: variations in the SRB payment method, increases in sea pay, and a range of TSP matching levels.[64] Table 12 shows the pay-equivalent values and compensation levels associated with each level of these three attributes. We discuss each in detail below.

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64. Clearly, changes in promotion schedules also have an impact on pay. However, we have included that attribute in our discussion of nonpay variables because we want to consider the nonpecuniary aspects of promotion as well.

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Table 12. Pay-equivalent values and pay-equivalent compensation levels for pay-related job attributes[1,2]

Attribute level	Pay-equivalent value [4]	Pay-equivalent compensation level[5]
SRB PAYMENT METHOD		
No SRB up front	NA	1.4%
50% up front[3]	NA	NA
75% up front[3]	0.1%	NA
All up front	NA	0.5%
SEA PAY		
No change	NA	NA
$50 increase	2.2%	NA
$125 increase	4.2%	NA
$200 increase	5.1%	NA
TSP MATCH		
No match	NA	NA
3-percent match[3]	1.9%	NA
5-percent match[3]	2.1%	NA
7-percent match	2.8%	NA

1. Based on the calibrated model for the full sample.

2. Unless otherwise noted, underlying predicted reenlistment rates within attributes differ by more than +/- one standard deviation.

3. Differences in underlying predicted reenlistment rates *not* greater than +/- one standard deviation for two level pairs: 50 and 75 percent of SRB paid up front, and 3 and 5 percent TSP match.

4. The pay-equivalent value of an attribute level is the percentage increase in basic pay that causes the same increase in the predicted reenlistment rate, all else equal.

5. The pay-equivalent compensation for an attribute level is the accompanying percentage increase in basic pay that is necessary bring the predicted reenlistment rate associated with the attribute level back to the base-case rate.

SRB payment method[65]

For the SRB payment method attribute, the survey results indicate that respondents in every subsample prefer SRB payment methods that include both lump-sum and installment components, followed by receiving the entire payment up front. The least preferred SRB payment method is to receive the whole bonus in annual installments. Because Sailors are typically assumed to have high discount rates, we expected to find that Sailors prefer receiving the entire amount up front.[66] We do not know the exact reason for our counter-intuitive finding; however, there are a few plausible explanations. Familiarity with the current SRB payment system may be the reason for the preference for a 50- or 75-percent upfront method. There may also be concerns about spending the entire SRB payment at once—having some of it paid in annual installments provides some guaranteed level of future payments and consumption. A third possibility is that having a portion of the SRB paid in annual installments averages income over the obligation length and, thus, decreases the total tax bill on SRB received. Finally, our estimates on preferences for SRB payment method may be suffering from measurement error; there may have been confusion over the survey wording because "Entire SRB spread over equal annual installments" and "Entire SRB paid up front" look similar at a glance.

Overall, these results do not indicate that changing the current SRB payment method would lead to large retention benefits for first-term Sailors.

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65. The two attributes, change in SRB payment method and increase in SRB multiplier, appear independently in the survey. Therefore, respondents' preferences for different levels of these attributes are also discussed independently.

66. The discount rate is a measure of the present value placed on future streams of income. Looking at the FY79 change in SRB payments from annual installments to lump-sum payment at reenlistment [40] estimates a real discount rate of 17 percent for Navy enlisted personnel. Using the annuity and lump-sum separation payment options offered during the drawdown as a natural experiment, [41] estimates a 17.5- to 19.8-percent discount rate for enlisted Servicemembers.

Sea pay

As expected, for the full sample, the pay-equivalent values of increases in sea pay get larger with the size of the increase. We also find that the pay-equivalent values of the sea pay increases were greater for respondents currently on sea duty than for respondents currently on shore duty. For example, among sea duty respondents, a $200 increase in monthly sea pay would influence reenlistment rates by the same amount as a 5.3-percent increase in basic pay; for shore duty respondents, the pay-equivalent amount was only a 4.5-percent increase in basic pay. We hypothesize that these differences reflect the fact that changes in sea pay have more concrete, immediate values for Sailors currently on sea duty than for those on shore duty, and will thus seem relatively more important to the sea-duty group.

These results indicate that increases in sea pay, which has historically been used as a distribution incentive, could also have substantial reenlistment effects.

Contributions to TSP

Also as expected, the pay-equivalent values of the different TSP matching levels increase with the size of the match. However, the pay-equivalent values differ for different subsamples. The pay-equivalent values of each match are larger for respondents who reported that they are currently participating in the TSP than for those who reported that they were not participating. Among TSP participants, a 7-percent TSP match results in the same predicted reenlistment rate as a 3.9-percent increase in basic pay; the pay-equivalent value of a 7-percent match for nonparticipants is only a 2.6-percent increase in basic pay. In addition, the pay-equivalent value of each TSP matching level was slightly higher for respondents with spouses or dependent children than for respondents without spouses or dependent children.[67] Finally, the subsample for which the pay equivalent values were lowest was respondents who stated that they did not intend to reenlist. This result indicates that retirement benefits are less relevant for people who have already decided against a Navy career.

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67. The result for people with dependent children may be attributable to the fact that those people were slightly more likely to participate in the TSP.

To see whether survey respondents are influenced by TSP match programs more than the monetary value of those programs would suggest, we constructed the following simple example. Table 12 shows that the pay-equivalent value of a 3-percent match on TSP contributions is a 1.85-percent increase in basic pay. Under the assumptions of an annual return on TSP funds of 6 percent and a 17-percent discount rate, we compare what a 23-year-old E-4 with 3 years of experience would receive from the 1.85-percent basic pay increase to what he would receive from a 3-percent match on TSP investment withdrawn at age 59.5 (assuming that the Sailor contributed to TSP up to the matching amount). The present discounted value from the increase in monthly pay is about $30 per month, whereas the present discounted value of additional income from the TSP match is a little over a $1 per month. Based on this example, it appears that, at the margin, a TSP matching program could have additional retention benefits beyond the monetary value of the benefits paid to participants. Note, however, that these results are sensitive to the assumptions made about returns to TSP investments and the discount rate. For example, if we change the discount rate parameter from 17 to 7.4 percent, expected values of the TSP match and the increase in basic pay are equal.[68]

Our survey results do not provide information on the costs to the Navy of the different match limits, which will depend on the participation rate and participation levels. However, as noted by [42], participation levels would most likely increase in response to implementation of a TSP match program.[69]

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68. In the case of the 7- and 10-percent TSP matches, the corresponding estimated discount rates that equate the monetary values of the match and the pay increase are 8.6 and 8.65 percent. These estimates ignore the difference in the aftertax values of these amounts; Sailors will most likely be in a lower tax bracket at retirement when withdrawing TSP, so our estimates understate the impact of the TSP matching incentive. Continuing from our simple case, assuming 40-percent earnings at retirement and using the 2002 tax table, for the 3-percent TSP match case (7, 10 percent) we estimate a discount rate of 7.5 percent (8.7, 8.8 percent).

69. Reference [42] notes that, if TSP were matched at 5 percent, the proportion of Servicemembers "very likely" to participate would increase from 7 to 35 percent.

Estimated monetary equivalents of nonpay factors

For the full sample, table 13 shows the pay-equivalent values and pay-equivalent compensation levels for each of the nonpay, QOS factors in the survey. These estimated monetary equivalents of nonpay factors provide a way to evaluate which Navy job characteristics are more or less valued overall. Looking only at QOS factors, the data show that assignment guarantees are the most valued QOS improvement, and asking Sailors to live on ship while in port during sea duty is the QOS factor that requires the largest offsetting compensation amount.

As previously noted, we also analyzed the results along a number of different respondent characteristics.[70] The QOS results for different subsamples are similar to the results for the full sample. Consequently, in the analysis that follows, we focus mainly on the results from the whole sample, and include discussions of the subsample results only when relevant.

Obligation length

Sailors prefer the typical 3-year reenlistment obligation length marginally over a 1-year obligation, and significantly more than 5- or 6-year obligations.

Even though it's longer, for all but two subsamples[71] the predicted reenlistment rate for the 3-year obligation is higher than or equal to the predicted reenlistment rate for the 1-year obligation. This preference for the 3-year obligation length is particularly strong for Sailors who indicated an intention to reenlist at EAOS: The estimated pay-equivalent compensation level for respondents intending to reenlist is a 1.5-percent increase in basic pay, compared to a 0.8-percent increase for the full sample. The relative preference for the longer obligation is surely a reflection of the fact that, to be eligible to

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70. The subsamples were by sea/shore duty, married/single status, no/dependent children, SRB eligibility, TSP contributor, reenlistment intentions, and whether the first obligation or expectations about the second obligation were more significant in the reenlistment decision.

71. For Sailors in paygrades E-3 and below and those who stated that they did not intend to reenlist, predicted reenlistment rates monotonically decreased with obligation length.

receive an SRB, it is necessary to reobligate for 36 months or more. In addition, the preference for the 3-year obligation may also be the result of perceived time costs associated with reenlisting.

Table 13. Pay-equivalent values and pay-equivalent compensation levels for nonpay, QOS factors[1,2]

ASSIGNMENT GUARANTEE		HOUSING	
Duty	4.3%	On-ship, plus	12.6%
Location	5.7%	3- to 4- person barracks, plus	7.7%
Location and Duty	8.9%	1- to 2- person barracks, plus	3.5%
TIME TO STUDY		**OBLIGATION LENGTH**	
3 hours per week	1.8%	1-year, plus	0.8%
6 hours per week[3]	2.6%	5-year, plus	2.9%
10 hours per week[3]	2.4%	6-year, plus	6.4%
PROMOTION SCHEDULE		**PROMOTION SCHEDULE**	
6 months sooner[3]	0.9%	6 months later, plus	5.3%
12 months sooner[3]	1.0%		
SHIPBOARD LIVING SPACE		**WORK TIME**	
Increased storage and locker space[3]	2.4%	30%, plus[3]	0.6%
Increased recreational space	1.6%	75%, plus[3]	0.2%
Increased berthing space[3]	2.4%	95%, plus[3]	1.0%
CONTACT A DETAILER		**CONTACT A DETAILER**	
Contact 12-months prior[3]	0.1%	Contact 6-months prior, plus[3]	1.1%
		Contact 18-month prior, plus[3]	0.7%

1. Based on predicted reenlistment rates from the calibrated model for the full sample.

2. Unless otherwise noted, predicted reenlistment rates within attributes differ by more than +/- one standard deviation.

3. Differences in underlying predicted reenlistment rates *not* greater than +/- one standard deviation for two level pairs: promotion 6 and 12 months sooner than expected; 50 and 75 percent of workweek using skills; 30 and 95 percent of workweek using skills; contacting a Detailer 9 and 12 months before PRD; contacting a detailer 6 and 18 months prior to PRD; 6 and 10 hours of voluntary education; and increases in storage and berthing space.

4.The pay-equivalent value of an attribute level is the percentage increase in basic pay that causes the same increase in the predicted reenlistment rate, all else equal.

5. The pay-equivalent compensation for an attribute level is the accompanying percentage increase in basic pay that is necessary bring the predicted reenlistment rate associated with the attribute level back to the base case rate.

Also of note is the significant perceived cost of reenlisting for 6 years instead of 5 years; though it is only a difference of 1 year, we find that the pay-equivalent compensation level is twice as high for a 6-year reenlistment as for a 5-year reenlistment. We also found that Sailors who perceived that they had better civilian opportunities also required greater compensation for longer obligation lengths.

Contact with a Detailer before PRD

We estimate no perceivable benefit to changing the time restrictions on when Zone A Sailors can contact a Detailer.

There was no statistical difference between the estimated reenlistment rate associated with allowing Sailors to contact a Detailer 12 months before PRD and the predicted reenlistment rate associated with the current 9-month restriction. However, being able to contact a Detailer well in advance of PRD, at 18 months, resulted in lower predicted reenlistment rates, perhaps because of the number of factors that can change in a Sailor's life within 1.5 years. Finally, decreasing the planning window also resulted in lower predicted reenlistment rates: the pay-equivalent compensation level for 6-month restriction was a 1.1-percent increase in basic pay.[72]

Assignment guarantees at PRD

The data show that assignment guarantees are the most valued QOS improvement.

As shown in table 13, for the full sample, the pay-equivalent values of assignment guarantees are higher than those of any of the other QOS improvements. This is also true for all subsamples. Furthermore, consistent with findings on preferences for homebasing,[73] we estimate that, if faced with the choice between a location and duty guarantee, more Sailors would select the location guarantee.

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72. Results for this attribute were the same for all subsamples.

73. For example, see [3], [43], and [44].

Promotion

The positive effect on reenlistment intentions of faster promotions is by far out-weighed by the negative effect of slower promotions.

For the full sample, the pay-equivalent values of earlier promotions—either 6 months or 12 months—is a 1-percent increase in basic pay. However, the pay-equivalent compensation level for a later promotion was a 5-percent increase in basic pay. Thus, although earlier promotions have a small positive reenlistment effect, later promotions have a substantial negative reenlistment effect. Furthermore, the same pattern holds for the subsamples. For all subsamples, the pay-equivalent values of early promotion range from 0.8- to 1.3-percent basic pay increases, and the pay-equivalent compensation levels range from 5 to 5.5 percent.

Promotion involves a known bump in paygrade, so it is possible to compare the estimated pay-equivalent values of faster promotions with the actual monetary value of a promotion to get some indication regarding the reasonableness of the survey results. Specifically, assuming a 5-year time horizon, we estimate the discount rate necessary to equate the income streams associated with the two early promotion options and their pay-equivalent-value increases in basic pay for four different scenarios. The four scenarios are defined by the assumptions made about the career point of the Sailors receiving the early promotions: we consider groups of E-4 Sailors with every combination of 3 or 4 years of experience and an expected promotion occurring in 2 or 3 years.[74] For a promotion that occurs 6 months sooner than expected, the range of estimated discount rates is from 8.6 to 22.5 percent. This range seems reasonable when compared with the 17- to 19.8-percent range estimated in [40] and [41]. In contrast, the discount rates that equate the income streams associated with the 12-month-early promotion option and its pay-equivalent-value increases in basic pay are much higher than any known estimates. This result suggests that the 12-month-early promotion option was "undervalued." One potential reason is that respondents may not have found this attribute level to be credible.

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74. The median respondent was of E-4 paygrade. For respondents who provided SSNs, the average length of service for E-4s was 3.5 years.

In-port sea duty housing

Asking Sailors to live on ship while in home port during sea duty is the QOS factor that requires the largest offsetting compensation amount.

The base-case level for the in-port, sea duty housing attribute was to receive BAH and live in civilian housing. Compared with this housing arrangement, for the whole sample, the pay-equivalent compensation level for living on ship while in port is a 12.6-percent increase in basic pay. The estimated pay-equivalent compensation levels were even higher for Sailors in paygrades E-3 and below (14.9 percent), respondents who are unsure about their reenlistment intentions (15 percent), and respondents who aren't eligible for an SRB (17.8 percent). These results are consistent with those of [9], which evaluated the impact of E-5 BAH and found that the "improvement in Zone A E-5 retention suggests that there may be a positive benefit for E-4 BAH."

Estimated reenlistment rates are also significantly influenced by the disincentive of living in barracks: for the full sample, the pay-equivalent compensation levels for living in 3- to 4-person or 1- to 2-person barracks while in port are 7.7-percent and 3.5-percent increases in basic pay, respectively.

Shipboard living space

In terms of predicted reenlistment rates, Sailors are more responsive to increases in individual living space than to increases in communal living spaces.

For the full sample, the pay-equivalent values of an "increase in storage and locker space" and an "increase in berthing space" are 2.4-percent increases in basic pay. In contrast, the pay-equivalent value of an "increase in recreational (study, fitness) space" is only a 1.6-percent increase in pay. Although these findings indicate a preference for more personal space over more recreational space, the fact that changes were not defined in terms of specific units of change (e.g., square feet) means that it would not be possible to make explicit calculations about the reenlistment effect of a given change in personal space versus the reenlistment effect of a given change in communal space. To see this point more clearly, note that to give all Sailors 1 additional square foot of personal space means giving an additional

square foot to each Sailor, but a 1-square-foot increase in recreational space would apply to all Sailors equally. Thus, if respondents perceived the unit of space in each of these cases to be the same, an increase in recreational space may offer a larger aggregate return than an increase in personal space.

Time during workweek spent using and developing training and skills

There is a preference for a balance between more intensive and less intensive work.

For this attribute, the predicted reenlistment rates associated with spending 50 percent and 75 percent of one's time using and developing training and skills were not significantly different. However, they were higher than the predicted rates for 30 percent and 95 percent. Thus, to the extent that using and developing one's skills represents more intensive work, these results indicate that Sailors prefer a workweek with some middling level of intensity.

This result has implications for how Sailors might react to changes in job intensity as the Navy switches to more computerized ships manned with fewer Sailors. Specifically, if such an environment is more hectic or stressful, Sailors may have to be compensated. However, we think that the pay-equivalent compensation level for working intensively 95-percent of the time rather than 50 percent of the time is likely to be an upper bound estimate: if the Navy were to decrease manning per ship, self-selection would most likely result in ships being manned by Sailors who prefer using and developing their skills.

Weekly time to study

A positive predicted reenlistment effect is associated with guaranteed time for voluntary education and study, with the maximum pay-equivalent value attached to a 6-hour guarantee.

For the whole sample, the pay-equivalent value of a 6-hour guarantee is a 2.6-percent increase in basic pay, which is higher than the pay-equivalent value of a 10-hour guarantee. Thus, the most valued study guarantee falls somewhere between 6 and 10 hours. Looking across

subsamples, we find that guaranteeing time to study has a relatively large pay-equivalent value for respondents who indicated that they would not reenlist. The pay-equivalent values of a 6-hour guarantee are 3.1- and 2.4-percent increases in basic pay for respondents who did not plan to reenlist and for those who did plan to do so, respectively. This result probably reflects the relatively low value placed on other job factors by people who don't plan to reenlist.

Using survey results

In this section, we present a general discussion of how the results of the NSRQOS, or any other CBC survey, might be used. We also take care to point out that any application that requires a calculation of the total number of extra reenlistments associated with a policy should be approached carefully. This is because such calculations are very sensitive to the base-case reenlistment level, which is usually artificially calibrated to match existing conditions.

Identify important areas for potential policy implementation

Basic pay equivalents give us a common metric by which to compare the values of different QOS factors.[75] Looking at our survey results, we can say that, on average, Sailors value a location guarantee 1.3 times more highly than they value a duty-type guarantee, and that they value increased storage and locker space or increased berthing space 1.5 times more than increased recreational space. We can also say that, on average, Sailors value a location guarantee more than twice as much as they value increased storage and locker space. These results give indications about what is really important to Sailors and what types of programs should be investigated for future implementation. For example, the fact that assignment guarantees substantially affect reenlistment intentions indicates that the Assignment Incentive Pay (AIP) program is likely to have a positive retention effect.

Understanding how Sailors value different job factors, however, is not sufficient for program implementation; implementation decisions require some comparison of potential program benefits to some estimate of costs. Detailed cost-benefit analyses of any of our survey items are beyond the scope of the study, but we can consider different approaches that could be taken.

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75. Simply looking at percentage changes in predicted reenlistment rates relative to the same baseline would also give a common metric for comparison.

Identify optimal program levels

Looking at relative values within attributes can help identify optimal program levels. For example, results from the NSRQOS indicate that, even though Sailors value guaranteed study time, they don't value a 10-hour guarantee more than a 6-hour guarantee. However, a 10-hour guarantee would be substantially more costly for the Navy to provide. Table 14 gives rough estimates of the monthly benefits of the different study guarantees, as perceived by Sailors, as well as estimates of the costs of the guarantees in terms of the monthly salaries that would be necessary to cover the lost man-hours. The data show that the estimated value of study time to the Sailor increases at a decreasing rate, but the cost to the Navy of providing that time increases at a constant rate equal to the hourly wage. Given the great extra cost versus the low extra benefit, it would not make sense to offer a 10-hour guarantee rather than a 6-hour guarantee.[76]

Other examples of this type of application in our survey come from the results on changes in restrictions on contacting a Detailer and changes in promotion schedules. The results from the NSRQOS indicate that there would be no great gain in allowing Sailors to contact their Detailers more than 9 months before their PRDs. And, the survey results indicate that speeding up the promotion schedule by 6 months would have a small positive reenlistment effect, but slowing down promotions would have a substantial negative effect.

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76. Of course, the data also show that for all subsamples and for all study-guarantee amounts, the perceived benefits implied by the survey results are less than the estimated costs, which could be taken to indicate that study-time guarantees are not cost-effective reenlistment incentives. However, we will show that simplistic applications of CBC results to evaluations of program cost-effectiveness can be misleading, so we do not draw that conclusion here.

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Table 14. Perceived benefits of study guarantees vs. estimated costs to provide them in terms of lost man-hours

| | Weekly (monthly) hours spent studying | | |
Perceived benefit vs. cost by paygrade	3 (13)	6 (26)	10 (44)
Below E-4[a]			
Perceived monthly benefit	$28	$38	$37
Monthly salary that would cover lost man-hours	$98	$196	$327
E-4[b]			
Perceived monthly benefit	$29	$40	$38
Monthly salary that would cover lost man-hours	$107	$213	$356
Above E-4[c]			
Perceived monthly benefit	$35	$48	$46
Monthly salary that would cover lost man-hours	$122	$244	$407

a. Of respondents who provided SSNs, the median length of service for E-1 to E-3 Sailors was 35 months, and the median paygrade was E-3, so in our calculations we used the 2002 basic pay table for E-3s with a length of service of 3 years.
b. Of respondents who provided SSNs, the median E-4 Sailors had 39 months of service, so in our calculations we used the 2002 basic pay table for E-4s with a length of service of 3 years.
c. Of respondents who provided SSNs, the median length of service for E-5 or higher ranked Sailors was 51 months, and the median paygrade was E-5. Our calculations, based on the 2002 basic pay table, are for E-5 Sailors with 4 years of service.

Compare costs of policies with equal estimated impacts or compare estimated impacts of policies with equal costs

Another way to use the survey results would be to ask what would be the cheapest way to get equivalent predicted changes in reenlistment rates. Or, conversely, one could compare the predicted reenlistment effects of equal-cost programs. Using this approach requires that the programs being compared have equivalent scope in terms of the numbers of Sailors who would be affected. To see why this is true, note that the CBC model predicts an expected change in the reenlistment rate of those Sailors to whom a program is made available. To have the same effect on overall reenlistment, and thus the same reenlistment benefit to the Navy, it must be the case that the programs in question apply to groups of equal size. Comparing programs of different sizes would require calculating the differences in the numbers of extra reenlistments.

Evaluate program cost-effectiveness with extreme caution

Finally, when using CBC survey results to evaluate the overall cost-effectiveness of any given program, it is important to use extreme care. As with comparisons of different-sized programs, the need for such care arises from the fact that cost-benefit analyses are likely to be sensitive to the absolute change in the reenlistment rate associated with the program or policy of interest. To make this issue more concrete, consider the following example based on the NSRQOS results regarding changes in total reenlistments associated with offering three types of assignment guarantees.

First, assume that under each of the three assignment guarantee programs included in the survey, 5,000 Sailors would be offered guarantees for their next assignments. In this scenario, the number of extra reenlistments associated with each guarantee type will be equal to the difference between the no-guarantee reenlistment rate and the program-specific reenlistment rate, times the number of Sailors being offered the guarantee. Next, assume that the no-guarantee reenlistment rate and the guarantee-specific reenlistment rates are as predicted by the calibrated CBC model from the NSRQOS, shown in column 2 of table 15. Based on these assumptions, the predicted number of additional reenlistments associated with a location guarantee, for example, is (.747-.581)*5,000, which is equal to 826.

Now, calculate the number of extra reenlistments associated with each program using different reenlistment rate predictions. Specifically, if we had not calibrated our model, the predicted reenlistment rates would be those shown in column 5 of table 15. Based on these rates, the number of additional reenlistments is much lower under each program (compare column 6 to column 3). For the location guarantee, the new calculation is (.156-.063)*5,000, which is equal to only 465.[77]

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77. What is driving the differences between the two scenarios is the fact that the differences between the no-guarantee and guarantee reenlistment rates are much smaller for the uncalibrated model than for the calibrated model.

Table 15. Predicted reenlistment benefits associated with assignment guarantees under alternative assumptions about initial reenlistment rates

| Assignment guarantee | Scenario #1: Reenlistment rates from the calibrated model | | | Scenario #2: Reenlistment rates from the uncalibrated model | | |
	Predicted reenlistment rate (%)	Number of additional Sailors reenlisting[1]	Total benefit to the Navy ($M)[2]	Predicted reenlistment rate (%)	Number of additional Sailors reenlisting[1]	Total benefit to the Navy ($M)[2]
No guarantee	58.1	N/A		6.3	N/A	
Location	74.7	826	20.1	15.6	465	11.3
Duty type	71.7	677	16.5	12.8	325	7.9
Both	77.5	966	23.5	19.3	649	15.8

1. This calculation assumes that guarantees were offered to 5,000 of Sailors such that the number of additional reenlistments is equal to the increase in the reenlistment rate associated with each guarantee program times 5,000.

2. This calculation assumes that the cost of replacing a Sailor is $24,301, as calculated in [24].

Furthermore, if we assume that the benefit to the Navy of the extra reenlistments is equal to the cost of replacing these Sailors had they not reenlisted, it is possible to calculate the overall benefit to the Navy under each scenario. Specifically, if the cost of replacing a Sailor is $24,301, as calculated in [25], the benefits to the Navy of each guarantee program and in each scenario are shown in columns 4 and 7 of table 15.

This example illustrates how the same CBC data and estimation technique can create quite different predicted changes in reenlistments associated with a given program depending on how the model is calibrated.[78] Therefore, in applications that are sensitive to absolute changes in the predicted rates, it is important to be very clear about the underlying assumptions and calibrations used. Furthermore, in a cost-benefit analysis, it is also necessary to calculate different cost estimates that vary appropriately with the predicted number of extra reenlistments.

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78. In the example, we compared calibrated vs. uncalibrated results. It would also be possible to create different market scenarios by calibrating to different baseline rates.

Summary and recommendations

Reflecting the dual tasking for this project, this section includes a summary of the survey results and their implications, as well as recommendations for future applications of the CBC methodology.

Survey results

The primary purpose of the NSRQOS was to increase policy-makers' understanding of how Sailors make tradeoffs between pay and non-pay QOS factors when considering their reenlistment decisions. In general, the survey results indicate that, even with several measures of pay included in the survey, nonpay factors play a substantial, measurable role in guiding Sailors' reenlistment intentions.

Here, we summarize the main findings from the survey and the primary implications of these findings. However, before presenting that summary, we make two important points to aid in its interpretation. First, the CBC results give information only about the potential reenlistment effects of policies covered in the survey. They do not yield any information about the costs of implementing these policies. Therefore, in no case do we recommend specific policy action. Instead, we focus on what the survey results indicate regarding the success of current policies, as well as which new policies could most fruitfully be explored with more detailed analyses.

Second, in the discussion of our findings, we implicitly assume that Navy planners are seeking ways to increase reenlistment rates. However, in the prevailing economic and political environments, this assumption may not be valid. As noted in the introduction to this report, reenlistment rates at the time of the survey were substantially higher than historical averages because of slow-growth economic conditions and increased patriotism following September 11th and leading up to the war with Iraq. Therefore, a more useful way to think about the survey results is that they suggest potential policy directions

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for future periods when reenlistment rates have returned to, or dropped below, normal levels.[79]

Main findings and their implications

Relative preferences for pay and nonpay job characteristics

Relative preferences for nonpay QOS job factors are listed in descending order of impact on the base-case reenlistment rate:

- Requiring sea-duty Sailors to live on ship while in port, rather than allowing them to receive BAH and live in civilian housing had a larger absolute impact on base-case reenlistment intentions than any other survey item. The effect of this option was even greater than that of a 10-percent increase in basic pay. In addition, the survey respondents strongly preferred living in civilian housing to living on base in group housing.

  These results suggest that the Navy should continue to pursue cost-effective ways to get junior Sailors off ships and into civilian housing.

- Making a 6-year, rather than a 3-year, obligation for the second term had the next largest impact. Furthermore, the negative effect of increases in the obligation length grew at an increasing rate.

  Based on this result, we conclude that the Navy is unlikely to benefit from pushing people into substantially longer reenlistment commitments. However, a real cost-benefit analysis of different plans would be necessary before any strong recommendations could be made. In particular, such a study should consider the tradeoffs associated with replacing a more senior Sailor with a new recruit.

Though not explicitly a reenlistment incentive, the survey results indicate that assignment guarantees do influence reenlistment intentions. A location guarantee was preferred over a duty type of guarantee, but both had substantial positive effects on the predicted reenlistment rate.

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79. See [45] for the manning issues associated with higher-than-planned reenlistment rates.

As noted previously, these results indicate that the AIP program is likely to have a positive retention effect.

- The QOS item that had the fourth largest impact on the base-case predicted reenlistment rate was postponing promotions by 6 months relative to expectations. In particular, the pay-equivalent compensation level of slowing promotions by 6 months was five times greater than the pay-equivalent value of speeding up promotions by 6 months or a year.

  This result suggests that Sailors are far more affected by frustrated promotion expectations than by marginal improvements, and that leadership should put more effort into ensuring that promotion expectations are reasonable and are met than in devising plans to speed up promotion rates.

- Study-time guarantees had a positive impact on reenlistment intentions, and the most preferred amount was 6 hours per week.

  This result supports anecdotal evidence that participation in voluntary education programs may be inhibited by work-related time constraints.

- Increases in shipboard living space also increased the predicted reenlistment rate relative to the base case. Respondents preferred increases in personal space (storage and locker space or berthing space) over increases in recreational space.

  This finding is consistent with focus group results regarding the need for increased storage space for personal items aboard ship.

- The survey data indicate that the current 9-month restriction on contacting a Detailer provides an acceptable planning window: decreasing the window to 6 months and increasing it beyond 18 months both had small, negative effects on reenlistment intentions.

  These survey results indicate that increasing the planning window was a popular component of Project Sail.

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- Finally, differences in the amount of time spent doing interesting work that uses and develops skills learned in training had negligible impacts on reenlistment intentions, but the preferred levels were 50 or 75 percent of the workweek.

    Overall this result indicates that Sailors don't want to work too hard, nor do they want to be bored.

Relative preferences for pay-related variables are as follows:

- As would be expected, increases in basic pay and the SRB multiplier have strong, positive effects on reenlistment intentions as measured by the predicted reenlistment rates. Our estimates of the pay elasticity of reenlistment and the SRB effect are both high relative to estimates based on RP data.

    These results indicate that respondents may have been overestimating their responsiveness to increases in pay and the SRB multiplier relative to other job factors in the survey. If this is indeed the case, then the pay-equivalent amounts may underestimate the true values of the QOS items.

- Although sea pay has historically been used as a distribution incentive rather than a reenlistment incentive, the survey results indicate that increases in sea pay have substantial, positive effects on reenlistment intentions.

    The sea pay reform that was implemented in October 2001 was intended to increase the importance of sea pay as a lever to drive first-term reenlistment decisions [46]. This result is consistent with that policy goal.

- Offering matching payments to TSP contributions has a positive impact on predicted reenlistment rates. Furthermore, the survey results indicated that reenlistment intentions are influenced by the TSP match programs more than the monetary values of those programs would suggest.

    This result indicates that a TSP matching plan would have a positive reenlistment effect, and that planners should begin to consider which ratings should be designated as eligible to receive TSP matching payments.

- Although theory suggests that lump-sum SRB payments should be preferred over payments made in installments, the survey results indicate that for SRB payment methods, the status quo was preferred to receiving the entire SRB up front.

This finding suggests that Sailors may be relying on the current SRB payment system as a financial management tool to help them spread income and consumption across time periods more evenly.[80] To the extent that the Navy is worried about overall standards of living for its junior Sailors, this factor should be considered before switching to a lump-sum plan.

Relative preferences by subsample

Analyzing differences in relative preferences by subsample did not identify QOS items with particularly strong reenlistment effects for one group, but not for others. However, there were some interesting patterns that emerged. First, married Sailors and Sailors with children had relatively strong preferences for pay-related variables and for TSP matches. And second, the reenlistment intentions of respondents who stated that they did not plan to reenlist and those who did not consider the Navy their best career option were less responsive to pay (as measured by both basic pay and the SRB multiplier) and more negatively affected by obligation length than were other groups.

To what extent can these results be generalized?

There are two fundamental reasons why results from the NSRQOS sample may not be generalizable to other time periods or to the whole enlisted force. On the time dimension, it has already been noted that the combined economic and political conditions under which the survey was fielded may have affected survey responses in a unique, unmeasurable way. In addition, given the low overall response rate, it may also be the case that our results suffer from response rate bias. Again, this bias is unmeasurable and can't be corrected. In particular, although we have weighted our sample so that it reflects the target population along certain observable characteristics, such weighting

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80. This finding is consistent with findings in [47] and [48].

cannot correct for differences in preferences between respondents and nonrespondents who are observationally the same.

Neither of these issues applies uniquely to this survey or to CBC survey data. In particular, historical RP data will not predict future behavior well if unmeasured conditions or relationships between variables change over time. Similarly, sample selection bias can arise with both SP and RP data.

The CBC approach

Benefits of using choice-based conjoint data

CBC is a flexible and realistic survey design option that provides an alternative source of data for statistical analysis when RP data do not exist. This situation may arise either because the policies of interest have yet to be implemented or because administrative data on the policy outcomes aren't collected. In addition, CBC models can be used to estimate potential responses to a larger range of attribute levels than occurs in RP data. This benefit arises because the amount of variation within survey attributes is specified by the researcher through the survey design, rather than being limited by historical or technical reality. For example, in the NSRQOS, we were able to introduce more variation in basic pay and in levels of sea pay than is observed in existing personnel data.

When compared with other types of stated preference surveys, there are two main benefits to CBC. First, CBC surveys present respondents with realistically framed questions that better mimic the discrete-choice decision process than do rating or ranking exercises. This is especially true when the choice tasks include a "none" option, which is something that can't be done with most other survey methodologies. Second, the choice tasks generate data with a structure that allows the researcher to quantify how respondents make tradeoffs among various levels of the different job or product characteristics within the survey, as well as to estimate reenlist/don't-reenlist threshold levels. Quantifying tradeoffs in this manner provides an internally consistent metric with which to evaluate respondents preferences for the survey items.

When to use CBC

As indicated above, surveys should be considered when appropriate RP data are not available and behavioral experiments are not feasible. According to [39], the choice to use a CBC survey rather some other SP data collection method depends on the extent to which the choices in question are comparative. Specifically, CBC is most appropriate when:

- Decisions are made on the basis of relatively few, well-known attributes, and decision-makers are expected to have substantial aversions to the worst levels of each attribute.

- Decisions are made on the basis of competitive differences among attributes given.

- The study goal is to simulate immediate, short-run responses to competitive offerings.

These criteria indicate that CBC is not the best methodology for modeling and predicting reenlistment rates over the long run. In particular, the decision to reenlist is complex, and surely isn't made on the basis of only a few well-known attributes. To put it in CBC terms, a CBC task will never fully characterize the determinations of the reenlist/don't-reenlist decision, which means that no concept will ever be truly "full profile." Instead, better Navy personnel applications of the CBC methodology would be analyses of proposed policies that entail well-defined tradeoffs. For example, from time to time, it is suggested that the Services should adopt a "cafeteria-style" benefits plan that offers different combinations of take-home pay, medical insurance, and retirement benefits, much like the plans available in the private sector. In the absence of RP choice data, a CBC survey in which respondents choose between various levels of combinations of these three factors would help to structure such a plan.

More targeted studies are also more consistent with appropriate uses of CBC results. Because CBC output should be used to assess *relative* preferences for different job characteristics, future CBC applications to personnel planning should be narrow enough to allow for specific policy simulations and comparative analyses. The research question posed in this study was very general—to compare the value of pay and

nonpay job factors. With this broad mandate, it was not possible to go into great detail on the potential desirability of implementing any specific policy associated with our survey items. In particular, we were not able to estimate the relative costs of the different policies covered in the survey.

Finally, although more targeted studies represent the optimal application of CBC, general applications, such as the NSRQOS, do have value. As an alternative preference elicitation technique, CBC data add information that goes beyond that which is collected using more traditional survey designs. In particular, CBC gives the ability to explicitly quantify relative preferences for different policies using a metric that is common across all survey items and respondents. The key to interpreting results from this type of general survey is to be mindful of the inherent left-out-variable issues and the extent to which CBC results degrade as the number of attributes increases and/or the concreteness of the attributes decreases. However, with these caveats in mind, it would make sense to consider including CBC-type questions in some of the regularly fielded Navy opinion surveys.

Appendix A: Navy Survey on Reenlistment and Quality of Service

INTRODUCTION

This survey asks about your preferences for various features of Navy life—ranging from pay, to the assignment process, to how you spend your workweek. Some of these features will be familiar to you, and some of them will be new programs and benefits that might be offered in the future. The Navy is conducting this survey to learn what it can do to make serving in the Navy more satisfying for every Sailor.

The survey has four sections. In the first section, you'll be asked to indicate how much you like or dislike various changes in Navy pay and benefits, as well as in various quality-of-service features. In the second section, you'll be asked to choose among job packages with various combinations of the features shown in section one. Throughout these first two sections, you'll be asked to keep in mind how the different Navy job characteristics might affect your reenlistment decision. In the third section, you'll be asked whether you would reenlist if certain packages were offered to you. Finally, in the fourth section, you'll be asked to give some basic information about yourself.

PRIVACY ACT STATEMENT

AUTHORIZATION. License to administer this survey is granted under OPNAV Report Control Symbol 1040-4, which expires 30 June 2003.

PURPOSE. The purpose of this survey is to obtain information on Sailors' preferences for different pay and benefits levels, and different quality-of-service factors. Information obtained in this survey will be used to quantify Sailors' preferences for the Navy job characteristics covered in the survey.

ROUTINE USES. The information provided in this survey will be analyzed by the Center for Naval Analyses (CNA) in Alexandria, VA. Analyses based on the survey data will support personnel research and policy formulation.

CONFIDENTIALITY. You will be asked, but not required, to provide your Social Security Number so that the survey data can be combined with data from other sources. All responses will be held in confidence by CNA. Information provided by each survey respondent will be statistically summarized with the responses of others, and will not be attributable to any single individual.

PARTICIPATION. Completion of this questionnaire is *entirely voluntary*. However, maximum participation is encouraged so that the data will be complete and representative. Failure to respond to any of the questions will *not* result in any penalties except possible lack of representation of your views in the final results and outcomes.

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INFORMED CONSENT AGREEMENT

The purpose of this survey project is to collect data that will assist the Navy in efficiently allocating resources to reenlistment incentives and quality-of-service issues. Please read the following informed consent agreement and check the box below.

For questions regarding Human Subjects issues, contact the NPRST Protection of Human Subjects Committee at DSN 882-3086, COM 901-874-3086, or IRB@persnet.navy.mil.

1. I have been informed that my responses to this survey are protected by the Privacy Act, and therefore they will not be disclosed or attributed to me.

2. I freely volunteer to participate in this survey project. I am aware that my refusal to participate will involve no penalties to me.

3. I am aware that I may discontinue participation in this survey at any time without any penalties to me.

By checking the informed consent box below, I give my voluntary informed consent to participate in this survey project.

INFORMED CONSENT ☐

SECTION 1

In this section, we want to know how much you like or dislike different pay, work, and quality-of-service factors associated with your Navy job. We would like you to rate each factor, and then tell us how important getting your most preferred level would be in making your reenlistment decision.

For example, consider the questions and answers related to ice cream:

Example:

How much do you like or dislike each of the following ice cream flavors? (Check 1 box for each item)	☹	-	-	-	☺	-	-,	-	☺
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Chocolate	☐	☐	☐	☐	☐	☐	☒	☐	☐
Vanilla	☐	☐	☐	☐	☒	☐	☐	☐	☐
Strawberry	☐	☐	☐	☐	☐	☐	☐	☐	☒
Rocky Road	☐	☐	☐	☒	☐	☐	☐	☐	☐

Considering these flavors you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☒	☐	☐	☐	☐	☐	☐

This person liked Strawberry flavor best, and Rocky Road least. This person also marked that it was only a little bit important to get Strawberry instead of Rocky Road.

Now that you have seen a practice question, we'd like you to do the same type of ranking for 13 Navy job characteristics. If you have questions about any of the survey items, refer to the list of job characteristics and definitions that was included in your survey packet.

Q1: Increase in Basic Pay

How much do you like or dislike each of the following <u>basic pay increases?</u> (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
No increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
3% increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
6% increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
10% increase	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>basic pay increases</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q2: Increase in Selective Reenlistment Bonus (SRB) Multiplier
(If your rating doesn't qualify for an SRB, assume your SRB multiplier is zero and you are being offered the increases shown below.)

How much do you like or dislike each of the following <u>increases in the Selective Reenlistment Bonus (SRB) multiplier?</u> (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
No increase in SRB multiplier	☐	☐	☐	☐	☐	☐	☐	☐	☐
½-point increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
1-point increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
2-point increase	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>SRB multiplier increases</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q3: Selective Reenlistment Bonus (SRB) Payment Method

How much do you like or dislike each of the following <u>Selective Reenlistment Bonus (SRB) payment methods?</u> (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
Entire SRB spread over equal annual installments	☐	☐	☐	☐	☐	☐	☐	☐	☐
50% of SRB up front, the remainder in annual installments	☐	☐	☐	☐	☐	☐	☐	☐	☐
75% of SRB up front, the remainder in annual installments	☐	☐	☐	☐	☐	☐	☐	☐	☐
Entire SRB paid up front	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>SRB payment methods</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q4: Increase in Monthly Sea Pay

How much do you like or dislike each of the following <u>increases in monthly sea pay</u>? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
No increase in sea pay	☐	☐	☐	☐	☐	☐	☐	☐	☐
$50 per month increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
$125 per month increase	☐	☐	☐	☐	☐	☐	☐	☐	☐
$200 per month increase	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>sea pay increases</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important					Extremely Important			
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q5: Navy Match to Your Individual Contributions to the Thrift Savings Plan (TSP)

How much do you like or dislike each of the following <u>limits on the dollar-for-dollar match to your TSP contribution</u>? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
No match	☐	☐	☐	☐	☐	☐	☐	☐	☐
Up to 3% of basic pay	☐	☐	☐	☐	☐	☐	☐	☐	☐
Up to 5% of basic pay	☐	☐	☐	☐	☐	☐	☐	☐	☐
Up to 7% of basic pay	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>TSP match limits</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important					Extremely Important			
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q6: Obligation Length for Second Term

How much do you like or dislike each of the following options for a <u>second-term obligation length</u>? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
1-year reenlistment obligation	☐	☐	☐	☐	☐	☐	☐	☐	☐
3-year reenlistment obligation	☐	☐	☐	☐	☐	☐	☐	☐	☐
5-year reenlistment obligation	☐	☐	☐	☐	☐	☐	☐	☐	☐
6-year reenlistment obligation	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>second-term obligation lengths</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important					Extremely Important			
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q7: Assignment Guarantee Following Reenlistment

How much do you like or dislike the following **assignment guarantees**? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
No location or duty guarantee for next assignment	☐	☐	☐	☐	☐	☐	☐	☐	☐
Location guarantee for next assignment	☐	☐	☐	☐	☐	☐	☐	☐	☐
Duty type guarantee for next assignment	☐	☐	☐	☐	☐	☐	☐	☐	☐
Location & duty type guarantee for next assignment	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the **assignment guarantees** that you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q8: Time Spent Doing Interesting Work That Uses and Develops Training and Skills

How much do you like or dislike spending the following amounts of time in an average workweek using and developing your training and skills? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
30% of your time	☐	☐	☐	☐	☐	☐	☐	☐	☐
50% of your time	☐	☐	☐	☐	☐	☐	☐	☐	☐
75% of your time	☐	☐	☐	☐	☐	☐	☐	☐	☐
95% of your time	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the **amounts of time spent using and developing your training and skills** you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q9: Change in Expected Promotion Date After Reenlistment

How much do you like or dislike each of the following **promotion schedules**? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
Get promoted 6 months **later** than expected	☐	☐	☐	☐	☐	☐	☐	☐	☐
Get promoted on expected date	☐	☐	☐	☐	☐	☐	☐	☐	☐
Get promoted 6 months **sooner** than expected	☐	☐	☐	☐	☐	☐	☐	☐	☐
Get promoted 12 months **sooner** than expected	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the **promotion schedules** you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q10: Restriction on When You Can Contact a Detailer To Discuss Billet Options

How much do you like or dislike each of the following restrictions on **time before Projected Rotation Date (PRD) when you can contact a Detailer?** (Check 1 box for each item)	☹ 1	- 2	- 3	- 4	☺ 5	- 6	- 7	- 8	☺ 9
6 months before PRD	☐	☐	☐	☐	☐	☐	☐	☐	☐
9 months before PRD	☐	☐	☐	☐	☐	☐	☐	☐	☐
12 months before PRD	☐	☐	☐	☐	☐	☐	☐	☐	☐
18 months before PRD	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the **restrictions on contacting a Detailer about your next billet** that you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q11: Guaranteed Time Per Workweek for Voluntary Education Classes and Study

How much do you like or dislike each of the following guarantees for **time set aside for voluntary education and study each week?** (Check 1 box for each item)	☹ 1	- 2	- 3	- 4	☺ 5	- 6	- 7	- 8	☺ 9
No guaranteed time per workweek	☐	☐	☐	☐	☐	☐	☐	☐	☐
3 hours per workweek	☐	☐	☐	☐	☐	☐	☐	☐	☐
6 hours per workweek	☐	☐	☐	☐	☐	☐	☐	☐	☐
10 hours per workweek	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the different **study-hour guarantees** you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q12: Shipboard Living Space

How much do you like or dislike each of the following **increases in shipboard living space?** (Check 1 box for each item)	☹ 1	- 2	- 3	- 4	☺ 5	- 6	- 7	- 8	☺ 9
No change in living space	☐	☐	☐	☐	☐	☐	☐	☐	☐
Increased storage and locker space	☐	☐	☐	☐	☐	☐	☐	☐	☐
Increased recreational (study, fitness) space	☐	☐	☐	☐	☐	☐	☐	☐	☐
Increased berthing space	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the **changes in shipboard living space** that you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Q13: In-Port, Sea-Duty Housing

How much do you like or dislike each of the following <u>in-port, sea-duty housing options</u>? (Check 1 box for each item)	☹	-	-	-	☺	-	-	-	☺
	1	2	3	4	5	6	7	8	9
Live on ship while in port	☐	☐	☐	☐	☐	☐	☐	☐	☐
Live in a 3- or 4-person barracks	☐	☐	☐	☐	☐	☐	☐	☐	☐
Live in a 1- or 2-person barracks	☐	☐	☐	☐	☐	☐	☐	☐	☐
Get BAH and live in civilian housing	☐	☐	☐	☐	☐	☐	☐	☐	☐

Considering the <u>in-port, sea-duty housing options</u> you just rated, how important is it to get the best one instead of the worst one?	Not Very Important							Extremely Important	
	☐	☐	☐	☐	☐	☐	☐	☐	☐

This is the end of Section 1. Thank you for your effort.
Instructions for Section 2 begin on the next page.

SECTION 2

This section has 15 questions. Each question presents four different combinations of the Navy job characteristics that you just rated. Thinking of these combinations as parts of potential Navy job packages, we would like you to indicate which package you like best. Another way to think of it is, which package would make you most likely to stay Navy?

To Select a Package
To select a package, check the box next to the package number. Please be sure to check only one box. For reminders about what each job characteristic is, refer to the enclosed list of definitions.

Q1: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
1-point increase in SRB multiplier	No increase in SRB multiplier	2-point increase in SRB multiplier	½-point increase in SRB multiplier
$50-per-month increase in sea pay	$125-per-month increase in sea pay	$50-per-month increase in sea pay	No increase in sea pay
Match TSP up to 3% of basic pay	Match TSP up to 5% of basic pay	Match TSP up to 7% of basic pay	No TSP match
Location and duty type guarantees for next assignment	Location guarantee for next assignment	No location or duty guarantee for next assignment	Duty type guarantee for next assignment

Q2: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
1-point increase in SRB multiplier	½-point increase in SRB multiplier	No increase in SRB multiplier	2-point increase in SRB multiplier
75% SRB paid up front, remainder in annual installments	Entire SRB paid up front	50% SRB paid up front, remainder in annual installments	Entire SRB spread over equal annual installments
3 hours per workweek for voluntary classes and study	6 hours per workweek for voluntary classes and study	10 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study
Increased shipboard recreational (study, fitness) space	Increased shipboard berthing space	No change in shipboard living space	Increased shipboard storage and locker space

Q3: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
Spend 95% of your time using skills and training	Spend 30% of your time using skills and training	Spend 50% of your time using skills and training	Spend 75% of your time using skills and training
Get promoted 12 months **sooner** than expected	Get promoted 6 months **sooner** than expected	Get promoted 6 months **later** than expected	Get promoted on expected promotion date
No change in shipboard living space	Increased shipboard recreational (study, fitness) space	Increased shipboard storage and locker space	Increased shipboard berthing space
Live in 3- to 4-person barracks	Live in 1- to 2-person barracks	Live on ship while in port	Get BAH and live in civilian housing

Q4: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
No basic pay increase	3% basic pay increase	3% basic pay increase	10% basic pay increase
5-year reenlistment obligation	3-year reenlistment obligation	1-year reenlistment obligation	6-year reenlistment obligation
Duty type guarantee for next assignment	No location or duty guarantee for next assignment	No location or duty guarantee for next assignment	Location guarantee for next assignment
Contact a Detailer 18 months before PRD	Contact a Detailer 6 months before PRD	Contact a Detailer 12 months before PRD	Contact a Detailer 9 months before PRD

Q5: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
No basic pay increase	10% basic pay increase	6% basic pay increase	6% basic pay increase
Entire SRB paid up front	50% SRB paid up front, remainder in annual installments	Entire SRB spread over equal annual installments	75% SRB paid up front, remainder in annual installments
Match TSP up to 3% of basic pay	Match TSP up to 5% of basic pay	No TSP match	Match TSP up to 7% of basic pay
Spend 50% of your time using skills and training	Spend 95% of your time using skills and training	Spend 30% of your time using skills and training	Spend 75% of your time using skills and training

Q6: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
$125-per-month increase in sea pay	$200-per-month increase in sea pay	$200-per-month increase in sea pay	No increase in sea pay
Spend 75% of your time using skills and training	Spend 50% of your time using skills and training	Spend 95% of your time using skills and training	Spend 30% of your time using skills and training
Contact a Detailer 9 months before PRD	Contact a Detailer 18 months before PRD	Contact a Detailer 12 months before PRD	Contact a Detailer 6 months before PRD
10 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study	6 hours per workweek for voluntary classes and study

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Q7: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
Entire SRB spread over equal annual installments	Entire SRB paid up front	50% SRB paid up front, remainder in annual installments	75% SRB paid up front, remainder in annual installments
6-year reenlistment obligation	3-year reenlistment obligation	5-year reenlistment obligation	3-year reenlistment obligation
Get promoted 6 months **later** than expected	Get promoted 12 months **sooner** than expected	Get promoted on expected promotion date	Get promoted 6 months **sooner** than expected
Live in 1- to 2-person barracks	Live on ship while in port	Live in 3- to 4-person barracks	Get BAH and live in civilian housing

Q8: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
No TSP match	Match TSP up to 3% of basic pay	Match TSP up to 7% of basic pay	Match TSP up to 5% of basic pay
1-year reenlistment obligation	6-year reenlistment obligation	5-year reenlistment obligation	1-year reenlistment obligation
10 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study	6 hours per workweek for voluntary classes and study
No change in shipboard living space	Increased shipboard recreational (study, fitness) space	Increased shipboard berthing space	Increased shipboard storage and locker space

Q9: Which of the following pay, work, and benefits packages is best for you?
Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
No basic pay increase	3% basic pay increase	6% basic pay increase	10% basic pay increase
Location and duty type guarantees for next assignment	Duty type guarantee for next assignment	Location guarantee for next assignment	No location or duty guarantee for next assignment
Get promoted 6 months **later** than expected	Get promoted 6 months **sooner** than expected	Get promoted on expected promotion date	Get promoted 12 months **sooner** than expected
3 hours per workweek for voluntary classes and study	10 hours per workweek for voluntary classes and study	6 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study

Q10: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
3% basic pay increase	10% basic pay increase	6% basic pay increase	No basic pay increase
$50-per-month increase in sea pay	$50-per-month increase in sea pay	$125-per-month increase in sea pay	$200-per-month increase in sea pay
No change in shipboard living space	Increased shipboard storage and locker space	Increased shipboard berthing space	Increased shipboard recreational (study, fitness) space
Get BAH and live in civilian housing	Live on ship while in port	Live in 1- to 2-person barracks	Live in 3- to 4-person barracks

Q11: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
1-point increase in SRB multiplier	½-point increase in SRB multiplier	No increase in SRB multiplier	2-point increase in SRB multiplier
Match TSP up to 3% of basic pay	Match TSP up to 5% of basic pay	Match TSP up to 7% of basic pay	No TSP match
Get promoted 6 months **later** than expected	Get promoted 6 months **sooner** than expected	Get promoted 12 months **sooner** than expected	Get promoted on expected promotion date
Contact a Detailer 6 months before PRD	Contact a Detailer 12 months before PRD	Contact a Detailer 9 months before PRD	Contact a Detailer 18 months before PRD

Q12: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 ☐	Package 2 ☐	Package 3 ☐	Package 4 ☐
½-point increase in SRB multiplier	1-point increase in SRB multiplier	No increase in SRB multiplier	2-point increase in SRB multiplier
6-year reenlistment obligation	3-year reenlistment obligation	1-year reenlistment obligation	5-year reenlistment obligation
Spend 95% of your time using skills and training	Spend 50% of your time using skills and training	Spend 30% of your time using skills and training	Spend 75% of your time using skills and training
Get BAH and live in civilian housing	Live in 1- to 2-person barracks	Live in 3- to 4-person barracks	Live on ship while in port

Q13: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 □	Package 2 □	Package 3 □	Package 4 □
Entire SRB paid up front	75% SRB paid up front, remainder in annual installments	Entire SRB spread over equal annual installments	50% SRB paid up front, remainder in annual installments
Location and duty type guarantees for next assignment	Location guarantee for next assignment	Location and duty type guarantees for next assignment	Duty type guarantee for next assignment
Contact a Detailer 18 months before PRD	Contact a Detailer 9 months before PRD	Contact a Detailer 6 months before PRD	Contact a Detailer 12 months before PRD
Live in 1- to 2-person barracks	Get BAH and live in civilian housing	Live in 3- to 4-person barracks	Live on ship while in port

Q14: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 □	Package 2 □	Package 3 □	Package 4 □
No basic pay increase	No basic pay increase	6% basic pay increase	3% basic pay increase
2-point increase in SRB multiplier	1-point increase in SRB multiplier	½-point increase in SRB multiplier	No increase in SRB multiplier
$125-per-month increase in sea pay	$200-per-month increase in sea pay	No increase in sea pay	$50-per-month increase in sea pay
3-year reenlistment obligation	3-year reenlistment obligation	3-year reenlistment obligation	1-year reenlistment obligation

Q15: Which of the following pay, work, and benefits packages is best for you? Assume the packages are identical in all ways not shown. (Check only one box.)

Package 1 □	Package 2 □	Package 3 □	Package 4 □
75% SRB paid up front, remainder in annual installments	Entire SRB paid up front	50% SRB paid up front, remainder in annual installments	Entire SRB spread over equal annual installments
No increase in sea pay	$200-per-month increase in sea pay	$125-per-month increase in sea pay	No increase in sea pay
Location and duty type guarantees for next assignment	Duty type guarantee for next assignment	No location or duty guarantee for next assignment	Location guarantee for next assignment
Get promoted 12 months **sooner** than expected	Get promoted 6 months **sooner** than expected	Get promoted 6 months **later** than expected	Get promoted on expected promotion date

This is the end of Section 2. Thank you for your effort. Instructions for Section 3 begin on the next page.

SECTION 3

Two sections down and two to go! We appreciate your time and patience thus far.

Section 3 has only nine questions and is the most important part of the survey, so please answer as carefully and realistically as you can. This section is important because we're asking you not only to tell us which job package you like best, but also to tell us whether you would reenlist if you were offered that job package. Please answer each question as truthfully as possible, as if you were really considering whether to reenlist. As stated earlier, this is confidential research, so your responses won't be made public or attributed to you in any way.

If you have already decided not to reenlist, no matter what you were offered, then you should probably tell us you would not reenlist for each of the questions in this section. If you will be considering reenlistment, then you have some interesting scenarios to consider in this section. Please imagine that these options were actually available.

To Select a Package
To select a package, check the box next to the package number. Please be sure to check only one box. For reminders about what each job characteristic is, refer to the enclosed list of definitions.

Q1: If you were facing your next reenlistment decision and this were the only option available to you, would you reenlist or not? Please check only one box.

Reenlist ☐	Don't Reenlist ☐
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT	
No basic pay increase	
2-point increase in SRB multiplier	
Entire SRB spread over equal annual installments	
$125-per-month increase in sea pay	
Match TSP up to 3% of basic pay	
6-year reenlistment obligation	If offered only this job package, I would not reenlist for a second obligation.
CAREER AND ASSIGNMENT PROCESS	
No location or duty guarantee for next assignment	
Spend 50% of your time using skills and training	
Get promoted 12 months sooner than expected	
QUALITY OF LIFE	
No guaranteed time for voluntary classes and study	
Live in 3- to 4- person barracks	

Q2: If you were facing your next reenlistment decision and these were the only two options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Don't Reenlist ☐
3% basic pay increase	6% basic pay increase	
1-point increase in SRB multiplier	½-point increase in SRB multiplier	
50% of SRB paid up front, remainder in annual installments	75% of SRB paid up front, remainder in annual installments	
$50-per-month increase in sea pay	No increase in sea pay	Neither of these packages appeals to me; I would rather not reenlist for a second obligation.
Match TSP up to 5% of basic pay	Match TSP up to 7% of basic pay	
3-year reenlistment obligation	5-year reenlistment obligation	
Location guarantee for next assignment	No location or duty guarantee for next assignment	
Spend 75% of your time using skills and training	Spend 30% of your time using skills and training	
Get promoted 6 months sooner than expected	Get promoted 6 months later than expected	
10 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	
Live in 1- to 2-person barracks	Get BAH and live in civilian housing	

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Q3: If you were facing your next reenlistment decision and these were the only three options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Reenlist, Package 3 ☐	Don't Reenlist ☐
PAY, BENEFITS, INCENTIVES AND TERMS OF REENLISTMENT			
No basic pay increase	3% basic pay increase	10% basic pay increase	
½-point increase in SRB multiplier	1-point increase in SRB multiplier	No increase in SRB multiplier	
75% of SRB paid up front, remainder in annual installments	Entire SRB paid up front	50% of SRB paid up front, remainder in annual installments	
$50-per-month increase in sea pay	No increase in sea pay	$125-per-month increase in sea pay	None of these packages appeals to me; I would rather not reenlist for a second obligation.
Match TSP up to 3% of basic pay	Match TSP up to 7% of basic pay	No TSP match	
1-year reenlistment obligation	5-year reenlistment obligation	6-year reenlistment obligation	
CAREER AND ASSIGNMENT PROCESS			
Duty type guarantee for next assignment	No location or duty guarantee for next assignment	Location guarantee for next assignment	
Spend 75% of your time using skills and training	Spend 50% of your time using skills and training	Spend 30% of your time using skills and training	
Get promoted 6 months later than expected	Get promoted 6 months sooner than expected	Get promoted 12 months sooner than expected	
QUALITY OF LIFE			
6 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	10 hours per workweek for voluntary classes and study	
Live on ship while in port	Get BAH and live in civilian housing	Live in 3- to 4-person barracks	

Q4: If you were facing your next reenlistment decision and this were your only option, would you reenlist or not? Please check only one box.

Reenlist ☐	Don't Reenlist ☐
10% basic pay increase	
No increase in SRB multiplier	
75% of SRB paid up front, remainder in annual installments	
$200-per-month increase in sea pay	
No TSP match	
1-year reenlistment obligation	If offered only this job package, I would not reenlist for a second obligation.
Location and duty type guarantees for next assignment	
Spend 75% of your time using skills and training	
Get promoted 6 months later than expected	
3 hours per workweek for voluntary classes and study	
Get BAH and live in civilian housing	

Q5: If you were facing your next reenlistment decision and these were the only two options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 □	Reenlist, Package 2 □	Don't Reenlist □
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT		
6% basic pay increase	No basic pay increase	
No increase in SRB multiplier	½-point increase in SRB multiplier	
Entire SRB paid up front	75% of SRB paid up front, remainder in annual installments	
$50-per-month increase in sea pay	$200-per-month increase in sea pay	
Match TSP up to 3% of basic pay	Match TSP up to 5% of basic pay	
3-year reenlistment obligation	5-year reenlistment obligation	
CAREER AND ASSIGNMENT PROCESS		
Duty type guarantee for next assignment	Location guarantee for next assignment	
Spend 95% of your time using skills and training	Spend 30% of your time using skills and training	
Get promoted on expected promotion date	Get promoted 6 months sooner than expected	
QUALITY OF LIFE		
6 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study	Neither of these packages appeals to me; I would rather not reenlist for a second obligation.
Live in 3- to 4-person barracks	Live on ship while in port	

Q6: If you were facing your next reenlistment decision and these were the only three options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Reenlist, Package 3 ☐	Don't Reenlist ☐
No basic pay increase	3% basic pay increase	6% basic pay increase	
2-point increase in SRB multiplier	No increase in SRB multiplier	½-point increase in SRB multiplier	
50% of SRB paid up front, remainder in annual installments	Entire SRB spread over equal annual installments	Entire SRB paid up front	
$125-per-month increase in sea pay	No increase in sea pay	$50-per-month increase in sea pay	
Match TSP up to 7% of basic pay	No TSP match	Match TSP up to 3% of basic pay	
6-year reenlistment obligation	1-year reenlistment obligation	3-year reenlistment obligation	
Location and duty type guarantees for next assignment	No location or duty guarantees for next assignment	Location guarantee for next assignment	None of these packages appeals to me; I would rather not reenlist for a second obligation.
Spend 95% of your time using skills and training	Spend 50% of your time using skills and training	Spend 75% of your time using skills and training	
Get promoted on expected promotion date	Get promoted 6 months later than expected	Get promoted 6 months sooner than expected	
10 hours per workweek for voluntary classes and study	No guaranteed time for voluntary classes and study	3 hours per workweek for voluntary classes and study	
Live in 3- to 4-person barracks	Live on ship while in port	Live in 1- to 2-person barracks	

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Q7: If you were facing your next reenlistment decision and this were your only option, would you reenlist or not? Please check only one box.

Reenlist ☐	Don't Reenlist ☐
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT	
3% basic pay increase	
2-point increase in SRB multiplier	
Entire SRB spread over equal annual installments	
$200-per-month increase in sea pay	
Match TSP up to 3% of basic pay	
5-year reenlistment obligation	If offered only this job package, I would not reenlist for a second obligation.
CAREER AND ASSIGNMENT PROGRESS	
Location and duty type guarantees for next assignment	
Spend 95% of your time using skills and training	
Get promoted on expected promotion date	
QUALITY OF LIFE	
6 hours per workweek for voluntary classes and study	
Live in 1- to 2-person barracks	

Q8: If you were facing your next reenlistment decision and these were the only two options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Don't Reenlist ☐
10% basic pay increase	6% basic pay increase	
1-point increase in SRB multiplier	2-point increase in SRB multiplier	
Entire SRB spread over equal annual installments	Entire SRB paid up front	
No increase in sea pay	$200-per-month increase in sea pay	
No TSP match	Match TSP up to 5% of basic pay	
3-year reenlistment obligation	6-year reenlistment obligation	
Location and duty type guarantees for next assignment	Duty type guarantee for next assignment	Neither of these packages appeals to me; I would rather not reenlist for a second obligation.
Spend 30% of your time using skills and training	Spend 95% of your time using skills and training	
Get promoted on expected promotion date	Get promoted 12 months sooner than expected	
No guaranteed time for voluntary classes and study	10 hours per workweek for voluntary classes and study	
Get BAH and live in civilian housing	Live in 1- to 2-person barracks	

Q9: If you were facing your next reenlistment decision and these were the only three options available to you, which would you choose, or would you not reenlist? Please check only one box.

Reenlist, Package 1 ☐	Reenlist, Package 2 ☐	Reenlist, Package 3 ☐	Don't Reenlist ☐
PAY, BENEFITS, INCENTIVES, AND TERMS OF REENLISTMENT			
10% basic pay increase	No basic pay increase	3% basic pay increase	
No increase in SRB multiplier	½-point increase in SRB multiplier	1-point increase in SRB multiplier	
50% of SRB paid up front, remainder in annual installments	75% of SRB paid up front, remainder in annual installments	Entire SRB paid up front	
$125-per-month increase in sea pay	$50-per-month increase in sea pay	No increase in sea pay	None of these packages appeals to me; I would rather not reenlist for a second obligation.
No TSP match	Match TSP up to 3% of basic pay	Match TSP up to 7% of basic pay	
6-year reenlistment obligation	1-year reenlistment obligation	5-year reenlistment obligation	
CAREER AND ASSIGNMENT PROCESS			
Location guarantee for next assignment	Duty type guarantee for next assignment	No location or duty guarantee for next assignment	
Spend 30% of your time using skills and training	Spend 75% of your time using skills and training	Spend 50% of your time using skills and training	
Get promoted 12 months **sooner** than expected	Get promoted 6 months **later** than expected	Get promoted 6 months **sooner** than expected	
QUALITY OF LIFE			
10 hours per workweek for voluntary classes and study	6 hours per workweek for voluntary classes and study	3 hours per workweek for voluntary classes and study	
Live in 3- to 4-person barracks	Live on ship while in port	Get BAH and live in civilian housing	

This is the end of Section 3. Thank you for your hard work. It's all downhill from here.

SECTION 4

In this section, we ask some basic background and demographic questions. Please indicate your answer to each question by checking the appropriate box.

What is your Social Security Number? (This is an optional question; if you do not want to give your Social Security Number, please enter 999-99-9999.) _____

What is your gender?
☐ Male   ☐ Female

How old are you?
☐ 18 or under   ☐ 27-30
☐ 19-22   ☐ 30-33
☐ 23-26   ☐ Over 33

What is the highest level of education you have completed?
☐ Less than high school
☐ Earned GED (not home-schooled)
☐ Home-schooled high school graduate equivalent
☐ High school graduate
☐ High school graduate with some college experience
☐ Associate's Degree
☐ Bachelor's Degree or higher

What is your marital status?
☐ Single   ☐ Divorced
☐ Married to a Non-Service-Member   ☐ Widowed
☐ Married to a Service Member

How many dependent children do you have?
☐ None   ☐ Three
☐ One   ☐ Four
☐ Two   ☐ Five or more

What is your ethnicity?
☐ Hispanic or Latino origin   ☐ Not Hispanic or Latino

What is your race?
☐ American Indian or Alaska Native   ☐ Native Hawaiian or Other Pacific Islander
☐ Asian   ☐ White
☐ Black or African American

What is your current paygrade?

☐ E-1   ☐ E-4
☐ E-2   ☐ E-5
☐ E-3   ☐ E-6 or higher

Do you expect to be promoted to the next paygrade between now and when you make your reenlistment decision?

☐ Yes   ☐ No

What kind of duty are you currently on?

☐ Sea Duty   ☐ Shore Duty

How near are you to your next Expiration of Active Obligated Service (EAOS)?

☐ Within 3 months   ☐ Within 18 months
☐ Within 6 months   ☐ Within 24 months
☐ Within 12 months   ☐ Over 2 years from now

What is your rating or expected rating? Indicate whether you are in the Nuclear Field and whether you serve on a submarine, then check the appropriate box below.

Are you in the Nuclear Field?   ☐ Yes   ☐ No
Do you serve on a submarine?   ☐ Yes   ☐ No

☐ AB	☐ CM	☐ GS	☐ PR
☐ ABE	☐ CN	☐ GSE	☐ QM
☐ ABF	☐ CTA	☐ GSM	☐ RP
☐ ABH	☐ CTI	☐ HM	☐ SH
☐ AC	☐ CTM	☐ HT	☐ SK
☐ AD	☐ CTO	☐ IC	☐ SM
☐ AE	☐ CTR	☐ IS	☐ SN
☐ AF	☐ CTT	☐ IT	☐ STG
☐ AG	☐ CU	☐ JO	☐ STS
☐ AK	☐ DC	☐ LI	☐ SW
☐ AM	☐ DK	☐ LN	☐ TM
☐ AME	☐ DM	☐ MA	☐ UC
☐ AMH	☐ DT	☐ MM	☐ UT
☐ AMS	☐ EA	☐ MN	☐ YN
☐ AN	☐ EM	☐ MR	☐ OTHER
☐ AO	☐ EN	☐ MS	
☐ AS	☐ EO	☐ MT	
☐ AT	☐ EQ	☐ MU	
☐ AV	☐ ET	☐ NC	
☐ AW	☐ EW	☐ NCCR	
☐ AZ	☐ FC	☐ OS	
☐ BM	☐ FN	☐ PC	
☐ BU	☐ FT	☐ PH	
☐ CE	☐ GM	☐ PN	

Does your rating qualify for a Selective Reenlistment Bonus (SRB)?
☐ Yes
☐ No
☐ I don't know

If your rating does qualify for an SRB, what is the SRB multiplier for your rating?

☐ 0.5	☐ 4.5
☐ 1	☐ 5
☐ 1.5	☐ 5.5
☐ 2	☐ 6
☐ 2.5	☐ 6.5
☐ 3	☐ 7
☐ 3.5	☐ I don't know
☐ 4	

Are you currently making contributions to the Thrift Savings Plan (TSP)?
☐ Yes   ☐ No

What are your plans for reenlistment?
☐ I plan to reenlist
☐ I do not plan to reenlist
☐ I plan to enter into a long-term extension of my contract
☐ I have not made my reenlistment decision yet

Which of the following has played, or is likely to play, a more significant role in your decision on whether or not to reenlist?
☐ My experiences during my first obligation term
☐ What I expect the next obligation term to be like

How strongly do you agree with the following statement: The Navy is my best current career choice.
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagree

How strongly do you agree with the following statement: It would be easy to find civilian jobs that compensate (pay and benefits) as well as my Navy job.
☐ Strongly agree
☐ Agree
☐ Neither agree nor disagree
☐ Disagree
☐ Strongly disagree

Appendix B: Survey materials

In the pages that follow, we present four survey materials:

- Notification Letter
- Cover Letter
- Survey Instructions
- About the Survey.

John A. Doe
Street Address
City, State (Country)

Dear John Doe,

The Navy is conducting a specialized opinion survey to determine how first-term Sailors feel about various features of Navy life-ranging from pay, to the assignment process, to how time is spent during the workweek. Results of this survey will provide important information about how the Navy can improve the overall quality of service for all enlisted personnel.

You have been randomly selected to participate in this survey from the group of all Sailors who are approaching their first reenlistment decisions. Your participation is very important because your responses will be taken as representative of the needs and concerns of all first-term Sailors, even those not selected to participate in the survey.

In the next few weeks, you will receive the *Navy Survey on Reenlistment and Quality of Service*. The survey will be on a floppy disk to be used in the disk drive of your PC. If you would rather not take the survey on a computer, please contact the NPRST Survey Operations Center to request a paper version. Call Zannette Uriell at DSN 882-4641 or COM 901-874-4641, or send an e-mail request to zannette.uriell@persnet.navy.mil.

Please complete and return the survey when you receive it. Your responses will be kept **strictly confidential**. Your answers will be statistically summarized with the responses of others, and only group results will be reported.

This is a very important topic, and your time and effort are appreciated. Thank you for your cooperation and assistance with this study.

Sincerely,

Amanda Kraus, Project Director
The Center for Naval Analyses

Joe Smith
Street address
City, State, zip

Dear Joe Smith,

The Navy would like your help in improving the quality
of service for every Sailor. The enclosed *Navy Survey on
Reenlistment and Quality of Service* was designed to gather
information about how much you value (or don't value)
different characteristics of your Navy job. Your responses
to the survey are very important because they will be used
by Navy planners to identify new policies and programs that
will make Naval service more satisfying and rewarding.

Sometimes people express concerns about the risks of
responding frankly to surveys like this. I assure you that
your responses will be anonymous to everyone except the few
researchers conducting the survey. Your answers will be
combined with those of other Sailors, and only group
results will be reported.

The survey is on the enclosed computer disk, and
instructions on how to start the survey are on the
following page. Information on how to request a paper
version of the survey is also included.

I urge you to complete and return the survey at your
earliest convenience. Quick response will ensure that your
opinions are reflected in the findings.

Thank you for your time and cooperation.

Sincerely,

Matt Henry
Assistant Deputy Chief of
Naval Operations
(Manpower and Personnel)

Survey Instructions

TAKING THE SURVEY

The survey should take about 40 minutes to complete. If you're taking it on the computer, it must be completed in one sitting. If you do have to stop in the middle, you can start all over, but you can't start again where you left off. Once you've started the survey, instructions on how to complete each section are given on individual screens throughout the survey.

PAPER VERSION

If you'd prefer not to take the survey on a computer, you can request a paper version by contacting the NPRST Survey Operations Center. Call Zannette Uriell at DSN 882-4641 or COM 901-874-4641, or send an e-mail request to zannette.uriell@persnet.navy.mil.

STARTING THE SURVEY

The survey program only works on PC Windows systems; it does not work on Macs. To start the survey, insert the disk in your computer. Then, browse to the floppy drive (usually A:), and double click RUN file. Or, you can click Start, then Run, and then type A:RUN in the window and click OK.

RETURNING THE SURVEY

Please return your completed survey in the enclosed disk mailer. No postage is necessary.

QUESTIONS?

If you have any questions about the survey, call the Center for Naval Analyses (CNA) at DSN 761-9683 or COM 703-824-2300 from 9 a.m. to 5 p.m. Eastern time. Ask to speak with Amanda Kraus (ext. 2277) or Diana Lien (ext. 2787). You can also send e-mail questions to krausa@cna.org or liend@cna.org.

SURVEY PARTICIPATION

You were randomly chosen to receive this survey from the group of all Sailors who are approaching their first reenlistment decisions. Participation in the survey is entirely voluntary.

About the Survey

The survey has four sections. In each of the first three sections, we use a different type of question to ask how much you like or dislike 13 features of your Navy job that are related to pay, benefits, and quality of service. All 13 features are defined in the list below. These definitions are also available in the "help" section of the computer survey. In the fourth section, we ask for some background information about you. For example, we ask your gender and age, as well as your rating and whether or not you intend to reenlist.

INCREASE IN BASIC PAY
Percent increase in current basic pay levels for all paygrades. This feature presents increases ranging from 0 to 10 percent. (Basic pay increases are subject to all applicable local, state, and federal taxes.)

INCREASE IN THE SELECTIVE REENLISTMENT BONUS (SRB) MULTIPLIER
Increase in the current SRB multiplier for your rating. The SRB multiplier ranges in value from 0 to 7, depending on your rating. The total SRB amount received is equal to the SRB multiplier times monthly basic pay times the number of years for which you reenlist. Under the current program, you must reenlist or extend for at least 36 months in order to qualify for an SRB. (Bonuses are subject to all applicable local, state, and federal taxes.)

PAYMENT METHOD FOR THE SELECTIVE REENLISTMENT BONUS (SRB)
How the SRB is paid out. The SRB could be paid out in a variety of ways, from equal installments in each year of the second term to a full, up-front payment at reenlistment. Currently, half of the SRB is given in a lump sum payment at the time of reenlistment, and the remainder is paid over time in equal annual installments.

INCREASE IN MONTHLY SEA PAY
Dollar increases in current monthly sea pay levels. Currently, sea pay ranges from $50 to $700 per month depending on rank and years of cumulative sea duty. This feature presents changes ranging from $0 to $200 per month. (Sea pay increases are subject to all applicable local, state, and federal taxes.)

LIMIT ON NAVY MATCH TO INDIVIDUAL THRIFT SAVINGS PLAN (TSP) CONTRIBUTIONS
Limits on the size of the Navy match to your TSP* contributions. This attribute presents various limits on the amount that the Navy would add to your individual TSP contributions. The limits in the survey range from 0 percent (no matching) to 7 percent. Limiting the match means that the Navy would match your contributions dollar-for-dollar only up to the stated percentage of your basic pay; any contributions you make beyond that percentage would not be matched. For example, if you contribute 5 percent of your basic pay each month, then a 3-percent limit means that the total contribution to your account each month will be the 5 percent that you contribute plus the 3 percent that the Navy contributes, for a total contribution equal to 8 percent of your monthly basic pay.

*The Thrift Savings Plan (TSP) is a retirement savings and investment plan that has been available to uniformed service members since last year. If you participate in the TSP, you make monthly contributions to your TSP account from your own pay on a pre-tax basis, and the amount you contribute and the earnings from your contributions are yours to keep even if you do not serve the 20 years necessary to receive military retired pay.

OBLIGATION LENGTH FOR SECOND TERM
Length of second-term obligation agreed to in your reenlistment contract. The options presented here range from a 1-year obligation to a 6-year obligation.

ASSIGNMENT GUARANTEE FOLLOWING REENLISTMENT
Guarantees for location and/or assignment type following reenlistment. The location guarantee could keep you at your current location or could give you your first choice for a new location. The assignment type guarantee could be for a duty type or for a school.

DURING THE AVERAGE WORKWEEK, THE TIME SPENT DOING INTERESTING WORK THAT USES AND DEVELOPS YOUR TRAINING AND SKILLS
On average, the total amount of time during the workweek spent using and developing previous training and skills. For example, using or developing the skills you learned at A-school.

CHANGE IN PROMOTION SCHEDULE
Getting promoted sooner or later than expected after reenlistment. Based on your current situation, you have some idea of when you are likely to be eligible for promotion to the next paygrade. This feature presents the possibilities of being promoted from six months later than your current expected date of promotion to one year sooner.

RESTRICTION ON WHEN YOU CAN CONTACT A DETAILER TO DISCUSS BILLET OPTIONS
The number of months before your Projected Rotation Date (PRD) when you can start talking to a Detailer about options for your next billet. Currently, you must wait until nine months before your PRD to contact a Detailer.

GUARANTEED TIME FOR VOLUNTARY EDUCATION CLASSES AND STUDYING
Guaranteed time allocated for voluntary education classes and studying each week. This is guaranteed time out of the normal workweek.

SHIPBOARD LIVING QUARTERS
Changes in the physical size of specific shipboard living spaces. The types of space specified in the survey are storage and locker space, recreational space, and berthing space.

HOUSING DURING IN-PORT SEA DUTY
Various types of housing during in-port sea duty. This feature presents the options to live on ship, to live in different-sized barracks, or to receive BAH and live in civilian housing, paying local market prices. Currently, unmarried Sailors in paygrades E-4 and below must live on ship throughout their sea duty tours, even when their ships are in port. Married Sailors and those in paygrades E-5 and above have the options to live on base (without BAH) or to live in civilian housing (with BAH).

Appendix C: Sampling strategy

Our sampling goal was to have enough respondents to allow for precise analysis of data from the full sample, as well as eight subsamples. The eight subsamples of interest were three paygrade categories, three marital status and number of dependents categories, and two current duty status categories. Based on the structure of our survey, 574 observations would allow for precise estimation of a sample. Using these minimum estimates, we find that the minimum necessary full sample size is about 1,500 respondents. Details of the sampling strategy are discussed below.

Sample size determination

The population of interest is Zone A Sailors within 12 months of their first reenlistment decision. The two steps to calculate the necessary sample size are (1) calculate the minimum sample size needed for a certain level of confidence, and (2) determine the number of groups on which the analysis is going to focus. Within each group, we would like to have the minimum sample size calculated in step 1.

Minimum sample size

For a CBC survey in which respondents complete a series of choice questions, the minimum sample size for measuring the choice probability is a function of the true probability and the number of questions, as well as the desired levels of accuracy and statistical significance. From [17], the minimim sample should be guided by the following condition:

(3)

$$n \geq \frac{(1-p)}{rpa^2} \Phi^{-1}\left(\frac{1+\alpha}{2}\right)$$

where n is the sample size, p is the true probability, r is the number of choice questions, a is the level of accuracy, α is the level of significance, and Φ represents the cumulative normal distribution.

To define the minimum sample size for this study, we assumed that the true choice probability, p, would be greater than or equal to 0.2, and we set the relative accuracy and significance levels at 3.5 percent and 95 percent, respectively. Finally, we also assumed that there are 11 effective observations per respondent.[81] Based on these assumptions, the condition defined by equation 3 yields a minimum sample size of of 574 for each subsample.

Sampling rates by subsample

As discussed earlier, there are eight subsamples on which we planned to do separate analyses. Because these groups are not independent of each other, the sampling strategy had to take into account membership in each of the 18 individual cells defined by the eight larger groups.[82] Table 16 shows the population size and sampling rate for each of the 18 cells. The data show that the probability that a Sailor in any of the 18 subgroups was sent a survey ranged from 15 to 100 percent. For the eight larger groups, the sampling rates ranged from 24 to 96 percent. Based on the assumption of a 15-percent response rate, some of the subgroup populations were too small to guarantee the minimum sample size.

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81. In a standard, full-profile CBC survey, each question seen by each respondent counts as an observation because all attributes are shown in each question. However, this is not the case for the NSRQOS because of its hybrid design. In particular, the partial profile choice section has 15 questions, each of which shows only 4 of the 13 attributes, and the nearly full-profile section has 9 questions, with each question showing 11 of the 13 attributes. (Furthermore, 3 of the 9 questions in the reenlistment decision section will be excluded from the model estimation to help determine the predictive power of the model.) Thus, we calculated the effective number of observations based on the probability that each attribute will appear randomly within the survey.

82. Specifically, 3 marital/dependents status categories times 3 paygrade categories times 2 duty status categories creates 18 individual cells.

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Table 16. Population counts and sampling rates for 18 demographic cells

Population - counts

Marital/ dependent status	Sea/shore status	below E-4	E-4	Above E-4	Sea/shore total	Marital/ dependent total
Not married, no kids	Shore	602	1,798	560	2,960	18,429
	Sea	2,152	9,792	3,525	15,469	
Married, no kids	Shore	162	632	234	1,028	2,813
	Sea	207	1,016	562	1,785	
Kids	Shore	260	849	259	1,368	3,644
	Sea	305	1,435	536	2,276	
Total	Shore	3,688	15,522	5,676	5,356	
	Sea				19,530	

Sampling rates - percentage[1]

Marital/ dependent status	Sea/shore status	below E-4	E-4	Above E-4	Sea/shore total	Marital/ dependent total
Not married, no kids	Shore	71.6	8.7	37.0	26.9	23.8
	Sea	70.1	8.3	36.0	23.2	
Married, no kids	Shore	97.5	94.6	97.0	95.6	96.2
	Sea	100.0	95.7	96.6	96.5	
Kids	Shore	94.6	73.1	85.3	79.5	79.8
	Sea	88.2	77.2	82.5	79.9	
Total	Shore	76.4	27.5	51.3	53.5	
	Sea				36.5	

1. Sampling rates differ from actual sample percentages because they are based on the total number of people to whom surveys were sent, and thus include people who did not receive surveys.

Appendix D: Sample weights

In this appendix, we list the sample weights used in the analysis (table17) and describe the method for calculating them.[83]

Table 17. Sample weights used in analysis

Paygrade Category	Dependent Child status	Marital Status	Sea Duty	Shore Duty
██████	██████	Single	2.791	2.675
E-1 to E-3	No kids	Married to a Servicemember	0.520	1.428
E-1 to E-3	No kids	Married to a non-Servicemember	1.321	5.216
██████	██████	Single	0.579	1.261
E-1 to E-3	Kids	Married to a Servicemember	0.250	0.547
E-1 to E-3	Kids	Married to a non-Servicemember	0.473	0.570
██████	██████	Single	4.804	2.750
E-4	No kids	Married to a Servicemember	0.982	1.169
E-4	No kids	Married to a non-Servicemember	0.765	0.922
██████	██████	Single	0.672	0.893
E-4	Kids	Married to a Servicemember	0.237	0.249
E-4	Kids	Married to a non-Servicemember	0.410	0.401
██████	██████	Single	1.142	0.904
E-5 and above	No kids	Married to a Servicemember	0.394	0.737
E-5 and above	No kids	Married to a non-Servicemember	0.280	0.308
██████	██████	Single	0.172	0.233
E-5 and above	Kids	Married to a Servicemember	0.165	0.088
E-5 and above	Kids	Married to a non-Servicemember	0.168	0.260

83. The methodology follows [28], [29], and [30].

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To make the survey sample more representative of the target population (i.e., Zone A Sailors within 12 months of their first reenlistment decision), we weighted the sample to account for differences in both sampling rates and differences in response rates by certain demographic characteristics. The weights, ω_{ij}, are calculated according to the formula in equation 4. Each component of the formula is discussed in turn.

(4)

$$\omega_{ij} = \left(\pi_{j_i} * \gamma_i\right)k$$

The first step in calculating the sample weights compares the target population with the sampled population to correct for the oversampling or undersampling of certain cells. Specifically, in equation 4, π_{ji} is the inverse of the sampling fraction:

π_{ji} = (# in target population in cell j) / (# in sampling population in cell j),

where the j cells correspond to the 18 demographic cells defined by the sampling strategy described in appendix C.[84] For example, for the cell defined by the characteristics married, no children, sea duty, and E-1 through E-3, the population was 240 Sailors, and of those 195 received a survey. So, the component of the weight that corrects for oversampling is 240/195, or 1.231.

The second weighting step accounts for differences in response rates across demographic characteristics. In equation 4, γ_i, represents the probability of nonresponse conditional on being sampled. The ideal approach for calculating this value would be to estimate the conditional nonresponse probability using a logistic regression model. However, some respondents did not provide their social security numbers, so we do not have complete information on which survey recipients responded and which did not. Therefore, instead of the logit estimate, we use the inverse of the response rate for each cell i:

γ_i = (# sampled in cell i) / (# responded in cell i).

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84. There are 18 cells that account for paygrade category (E-1 to E-3, E-4, and E-5 up), duty assignment (sea, shore), marital status (married, single) and dependent child status (kids, no kids).

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In this case, the i cells correspond to 36 demographic groups with substantially different response rates. The only difference between the 18 and the 36 cells is that, in the second case, instead of looking at only at single vs. married, we looked at three categories: single, married to a non-Servicemember, and married to a Servicemember.

Finally, the constant, k, in equation 4 scales the weights so that the weighted and unweighted samples sizes are equal and their descriptive statistics are consistent. Specifically, k is equal to the ratio of the total number of respondents to the sum of the weights:

(5)

$$k = \frac{\#\text{respondents}}{\sum_i \omega_{ji} * \gamma_i}$$

Appendix E: Statistical estimation of the CBC model

Data cleaning

An important first step in the estimation process is to screen the individual survey responses to eliminate data from respondents who clearly did not complete the survey conscientiously. For data cleaning, we looked at time taken to complete the partial profile questions (i.e., section 2), and the degree to which there were patterned responses to these questions.[85] Frequency counts on these measures suggest that the vast majority of respondents were putting thought and effort into completing the survey. After reviewing the data, we chose to eliminate any respondent who took fewer than 2 minutes to complete section 2 and any respondent who chose the same response or had the same pattern of responses on all 15 questions in the section. Based on these criteria, 34 respondents were dropped from the sample.

Procedure for combining data from partial- and full-profile questions[86]

Recall that the NSRQOS survey included two types of choice questions: section 2 of the survey had 15 partial profile questions that did not include a "don't-reenlist" option and in which each choice was defined by only four attributes; section 3 included 9 nearly full-profile questions that did include a "don't-reenlist" option and in which each choice was defined by 11 attributes. The purpose of asking two types

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85. For example, choosing the same concept over and over, or choosing in a 1, 2, 3, 4, 1, 2, 3, 4, etc., pattern.

86. Excerpt from the appendix of [24].

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of questions was to minimize the potential problems associated with having so many job attributes in the survey. The partial profile questions were included to get stable estimates of the utility values for all four levels of each of the 13 attributes, and the full-profile questions were included to allow estimation of the probability that the "don't-reenlist" option would be chosen.

Stated preference research suggests several alternative ways to combine data from different types of preference questions.[87] We elected to combine data from the partial- and full-profile sections into one data set and employ a one-step estimation procedure. To do this, we appended data from the full-profile questions to the data for the 15 partial profile tasks, for a total of 24 choice tasks per respondent. Using this approach, the utility values for each attribute level were estimated primarily from the partial-profile data, and these estimates were further refined by information from the full-profile questions. However, estimation of the "don't-reenlist" threshold was based entirely on information form the full-profile data; the partial profile data contributed no information to this process since those questions did not include a "none" option.

To use the responses from both sections in a one-step estimation procedure, the data are combined into a single independent variable matrix, X, with associated Y choices. The X matrix has 40 total columns. The first 39 columns are all effects-coded parameters representing the 13 attributes (each with three effects-coded columns representing the four levels of each attribute). The final parameter in the X matrix is the dummy-coded "None" parameter (1 if a "None" alternative, 0 if not). For the first 60 rows of the design matrix (the partial-profile choice tasks), the "None" is not available. For the last 18 rows (capturing data from the full-profile choice tasks), the none parameter is equal to 1 if the respondent chose the "don't-reenlist" option. Thus, the full-profile choice tasks contribute the only information regarding the scaling of the None parameter relative to the other parameters in the model.

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87. We tested three different methods for combining data from the first three sections of the survey. In this report, we describe only the preferred approach; see [23] for descriptions of the other two.

Estimation technique—hierarchical Bayesian estimation

The goal of CBC analysis is to estimate parameter values that quantify the impact of each attribute level on the likelihood that a survey option with that level will be chosen. The most common model of choice is the conditional logit model in which the probability of choosing a given option is determined by its characteristics (defined by the x vector), and the parameters of interest are the βs, also known as utility values:

$$\text{prob}_i = \frac{\exp(x'_i \beta)}{\sum_i \exp(x'_i \beta)} \tag{6}$$

Given the logit model, there are several available estimation techniques. The most common technique is maximum likelihood estimation (MLE), which produces a utility value for each attribute that reflects the average utility value for all individuals in the sample. Thus, using MLE, the logit model generates one aggregate estimate of the β vector from which is generated an aggregate estimate of the probability of choosing option i. For the QOS data, the model would predict an overall, average reenlistment rate.

A drawback to using the maximum likelihood technique is that it is very difficult to use estimation output to construct confidence intervals around the eventual probability estimates; this can be problematic for policy formulation. To avoid this weakness of the MLE approach, we opted to use the hierarchical Bayes (HB) estimation method. The HB method generates *individual-specific* utility parameters (i.e., an individual β vector) for each respondent in the sample, and from these utility estimates, the model generates individual-specific choice probabilities.[88] The predicted choice probability, or reenlistment rate, for the whole sample is the average of all the individual choice probabilities. Therefore, given the variance of these

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88. A more frequently cited reason for using HB instead of logit is that HB models are not subject to the problems associated with the IIA (independency of irrelevant alternatives) property of the logit model. See [16] for a discussion of logit and IIA.

individual probability estimates, it is possible to construct standard errors around the aggregate probability estimates.[89]

Treatment of respondents who picked "none" every time

Using HB to model at the individual level allowed us to give special treatment to respondents who picked the "don't-reenlist" option at every opportunity. Section 3 of the QOS survey began with the following instruction to respondents: "If you have already decided not to reenlist, no matter what you were offered, then you should probably tell us you would not reenlist for each of the questions in this section." In response to this instruction, 191 survey respondents did indeed pick the "don't-reenlist" option on all nine full-profile questions.

For these 191 respondents, it was not clear how to scale the "don't-reenlist" thresholds relative to the utilities associated with the different full-profile reenlistment options. However, we did not want to give up information provided by their responses to the partial-profile questions. Therefore, we employed the following strategy: First, we excluded these respondents from the initial estimation phase that used the combined data. Then, we separately estimated their individual utilities using data from section 2 only. Finally, these utilities were reincorporated into the final simulator, and "none" thresholds for these respondents were set by hand at particularly high values.

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89. See [49] and [50] for more on HB estimation.

Appendix F: Internal validation

What is internal validation?

Internal validation of a survey instrument measures how well the estimated model predicts respondents' answers within the context of the survey. Along with the data cleaning steps, internal validation is done to gauge the extent to which the data are internally consist and, thus, represent meaningful attempts by respondents to assess the impact of the attribute levels on their eventual choices.

It is important to understand that *internal* validity does not ensure *external* predictive validity because the survey instrument can never fully capture the real environment of choice. However, internal validity is an important starting point: a model that does not perform well on internal validity checks is not likely to predict future behavior well either.

Holdouts

Holdout tasks are used to check the internal validity of the survey instrument. Responses to these tasks are excluded from the estimation process. Then, once the model parameters have been estimated, the model is used to predict responses to the holdout tasks. To check the internal validity of our model, we held out both choice tasks and respondents. First, data from only six of the nine choice tasks were used to estimate the utility values; the other three tasks were held out for testing purposes. Second, we also "held out" respondents. Specifically, we randomly divided the sample into two halves, then used the model estimated with data from the first half to predict choices on the holdout tasks for the second half, and vice versa.[90]

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90. After completing the internal validity tests, the model was reestimated using all tasks and all respondents. Survey results reported in this document are based on the full model.

Measures of internal validity

Test/re-test reliability

To assess respondents' test/re-test reliability, questions 3 and 9 in section 3 offered the same three reenlistment options (plus none), but they were presented in different order. Respondents' answers to the two questions were compared to see how often people made the same choice on both questions. Overall, respondents in our sample answered the same way 62 percent of the time. This level of consistency is considered satisfactory and suggests that respondents were fairly consistent in their choices.[91]

Hit rates

The next measure of internal validity is the model's "hit rate." To estimate hit rates, the model is used to predict what each person would choose on each of the holdout tasks. Then the predicted choice is compared with the actual choice. The hit rate is the percentage of times the prediction was correct across the whole sample. The hit rate for our model was 65 percent.

To determine whether this hit rate is high or low, we compare it to our assessment of test/re-test reliability. Theoretically, if respondents only chose the same reenlistment option on the same task 62 percent of the time, the hit rates from the CBC model should not be expected to substantially exceed that 62 percent.[92] The fact that the hit rate for our model is higher than the test/re-test percentage indicates that it performs well on this measure of internal consistency.[93]

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91. This assessment comes from the Sawtooth consultant who worked on this project. It is based on several years of experience estimating CBC models.

92. Reference [51] demonstrates that, for a given test/re-test percentage, p, the theoretical maximum hit rate is $[1 + (2p-1)^{1/2}]/2$, or 75 percent for our sample.

93. See [23] for other measures of internal validity, as well as a comparison of internal validity measures for alternative modeling approaches using the QOS survey data.

Appendix G: External validation

The fact that the model is calibrated to match current conditions means that validating the baseline reenlistment rate by comparing it to the actual reenlistment rate doesn't make sense. However, it does make sense to compare differences in predicted reenlistment rates across subsamples to differences in actual rates and stated intentions across the same subsamples. Cross-sample comparisons between the CBC predictions and actual reenlistment behavior provide a limited assessment of the predictive validity of the survey results; comparisons between the CBC predictions and the reenlistment rates implied by explicitly stated reenlistment intentions illustrate the differences between the two survey formats.

For selected groups defined by demographic characteristics and Navy career variables, table 18 shows the reenlistment rates implied by respondents' explicitly stated reenlistment intentions, the baseline rates predicted by the CBC model, and the actual reenlistment rates of respondents for whom decision data were available. To make meaningful comparisons across the three indicators of reenlistment likelihood, we used data only for respondents who provided SSNs and whose responses, therefore, could be directly compared to actual behavior. Making this cut allows us to abstract from differences between actual and predicted rates that might be related to survey response bias as opposed to shortcomings of the model.[94] Furthermore, because we are making direct comparisons and not trying to generate predictions that are representative of the entire target population, we used unweighted, rather than weighted, samples. The

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94. Recall that the reenlistment rate for respondents who provided their SSNs was higher than the rates for both the target and the sample populations, and that respondents who provided their SSNs were also more likely than those who didn't to state that they intended to reenlist at the time of the survey. (See table 5 and the discussion of the data presented there.)

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Table 18. Reenlistment intentions and behavior for SSN providers and selected subsamples of SSN providers[1]

Subsample	Percent intending to reenlist		Actual reenlistment rate[4]
	Stated[2]	Predicted[3]	
All	*38.1%*	*60.6%*	*68.8%*
Marital status			
Single	30.4%	58.9%	64.4%
Married[5]	46.8%	51.9%	71.7%
Number of children			
No children	32.9%	59.4%	65.2%
1 or more children[5]	43.3%	61.9%	72.2%
SRB eligibility			
Eligible	40.6%	59.3%	70.7%
Ineligible or don't know	35.4%	62.2%	66.3%
Sea/shore duty			
Sea	39.5%	61.6%	71.7%
Shore	34.3%	58.2%	61.0%
Decision criterion			
Experience in 1st term	30.2%	57.2%	53.7%
Expectations for 2nd term	46.8%	64.3%	84.6%
The Navy is my best current career choice			
Agree or strongly agree	59.1%	67.0%	86.1%
Neither agree nor disagree	31.3%	63.4%	68.6%
Disagree or strongly disagree	9.0%	45.3%	32.0%
It would be easy to find a civilian job that compensates as well as my Navy job			
Agree or strongly agree	31.5%	56.2%	62.3%
Neither agree nor disagree	37.2%	63.2%	66.7%
Disagree or strongly disagree	51.3%	65.7%	81.2%

[1]To ensure comparability with the group of Sailors for whom we have data on actual decisions, we limited the analysis to include only those respondents who provided SSNs when taking the survey, and used unweighted samples. Therefore, predicted and actual reenlistment rates presented in this table are different from those presented elsewhere in the report.

[2]Of the 978 respondents who provided SSNs and of the named subsamples of the SSN group, these are the percentages who stated that they intended to reenlist or enter into a long-term extension at their first decision point; they do not include those who stated that they were undecided.

[3]Of the 978 respondents who provided SSNs and of the named subsamples of the SSN group, these are the baseline reenlistment rates predicted by the calibrated CBC model.

[4]These rates are the based on actual reenlistment behavior for the 551 respondents in the sample who provided SSNs and had made reenlistment decisions as of 30 June 2003.

[5]Sample sizes for Sailors married to Servicemembers and non-Servicemembers and sample sizes for Sailors with 1 dependent child and two or more dependent children were too small for separate analyses.

resulting "full" sample sizes for the stated and predicted rates are 978, and the sample size for the actual rate is 551. The difference is due to the fact that some of the SSN providers had not reached decision points by the cut-off date.[95] Demographic subsamples were created from these limited "full" samples.

The data show that, in general, cross-sample differences in the CBC baseline rates are similar to cross-sample differences in both stated intentions and actual reenlistment behavior. By all indicators, married Sailors and Sailors with dependent children are more likely to reenlist than single Sailors and Sailors with no children, respectively.[96] Similarly, Sailors making their reenlistment decisions based on their expectations for the second term are more likely to reenlist than those making their decisions based on their first term experiences. Finally, by all three measures, the likelihood of reenlistment increases with the level of agreement with the statement that the Navy is the best career choice, and decreases with the level of agreement with the statement that it would be easy to find a comparable civilian job.

There is only one set of subsamples for which the predicted reenlistment rates don't follow the same pattern as either the actual reenlistment rates or the rates implied by stated intentions. The calibrated CBC model predicts that Sailors who indicated that they were eligible for SRBs will be less likely to reenlist than those who indicated that they were not eligible or that they didn't know their eligibility. In con-

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95. To maximize the numbers of observations used to genereate predicted reenlistment rates by subsample, we did not restrict the sample for the predicted (or stated) rates to include only those respondents who had made decisions. This was considered reasonable because, in contrast to the comparison between those who did and did not provide SSNs, there is no *a priori* expectation that the behavior or intentions of respondents who reached decision points by 30 June 2003 should differ from those who had not reached decision points.

96. The sample sizes for SSN-providers married to nonservicemembers and having more than one dependent child were too small to allow for comparisons across these finer disaggregations.

trast, actual reenlistment rates and stated reenlistment intentions were higher for Sailors who indicated that they were SRB eligible.

Despite the one divergence, the data show that the CBC model is indeed picking up some important subsample differences in the overall likelihood of reenlistment. However, the same is true for the reenlistment rates implied by the explicitly stated intentions. A key difference between the two survey techniques is that the CBC model provides a prediction of behavior for respondents who were undecided at the time of the survey.

Appendix H: Predicted reenlistment rates by subsample and attribute level

Tables 19 and 20 list the predicted reenlistment rates for each attribute level. Table 19 presents the predicted reenlistment rates for the full sample and by paygrade category. Table 20 presents predicted reenlistment rates by marital status, dependent status, and duty status. All estimates are based on the calibrated model and observations are weighted using the sampling weights presented in appendix D.

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Table 19. Predicted reenlistment rates (standard errors) for different samples

Attribute Level	Full sample	E3 and below subsample	E4 subsample	E5 and above subsample
Current condition	58.12 (0.89)	57.7 (2.79)	59.8 (1.38)	54.53 (1.30)
1-year obligation	55.1 (0.90)	58.09 (2.79)	55.86 (1.42)	65.19 (1.31)
5-year obligation	46.52 (0.89)	45.44 (2.85)	48.1 (1.4)	71.49 (1.32)
6- year obligation	38.22 (0.88)	37.85 (2.78)	39.3 (1.38)	74.88 (1.34)
3 percent increase	69.09 (0.87)	68.16 (2.77)	71.02 (1.33)	65.19 (1.31)
6 percent increase	75.18 (0.86)	74.17 (2.78)	77.04 (1.29)	71.49 (1.32)
10 percent increase	78.29 (0.87)	76.65 (2.81)	80.18 (1.29)	74.88 (1.34)
1/2-point increase	65.96 (0.87)	65.04 (2.78)	67.88 (1.33)	62.09 (1.31)
1-point increase	68.21 (0.87)	66.99 (2.78)	70.12 (1.33)	64.51 (1.31)
2-point increase	71.04 (0.88)	69.44 (2.79)	72.96 (1.33)	67.55 (1.32)
Entire SRB paid in annual installments	52.84 (0.90)	51.52 (2.84)	54.57 (1.41)	49.61 (1.29)
75% paid up front, remainder in annual installments	58.5 (0.90)	57.8 (2.82)	60.2 (1.39)	55.02 (1.31)
Entire SRB paid up front	56.09 (0.90)	55.45 (2.82)	57.53 (1.40)	53.16 (1.30)
$50 per month	66.19 (0.88)	66.19 (0.88)	68.24 (1.34)	62.3 (1.31)
$125 per month	71.49 (0.87)	70.43 (2.76)	73.49 (1.31)	67.51 (1.31)
$200 per month	73.35 (0.87)	72.08 (2.78)	75.21 (1.31)	69.79 (1.32)
Up to 3% of basic pay	64.89 (0.88)	63.84 (2.79)	66.86 (1.35)	60.98 (1.30)
Up to 5% of basic pay	65.72 (0.88)	64.66 (2.79)	67.71 (1.34)	61.76 (1.31)
Up to 7% of basic pay	68.44 (0.87)	66.76 (2.78)	70.51 (1.31)	64.65 (1.31)
Location guarantee	74.65 (0.87)	73.37 (2.77)	76.84 (1.31)	70.36 (1.33)
Duty guarantee	71.66 (0.87)	70.63 (2.8)	73.84 (1.32)	67.24 (1.32)
Location & duty guarantee	77.45 (0.87)	76.44 (2.79)	79.53 (1.31)	73.26 (1.33)
30% of the time	55.72 (0.90)	54.69 (2.83)	57.47 (1.40)	52.31 (1.30)
75% of the time	57.57 (0.89)	56.57 (2.82)	59.41 (1.38)	53.93 (1.30)
95% of the time	54.14 (0.90)	53.35 (2.85)	55.81 (1.40)	50.76 (1.29)
Get promoted 6 months later than expected	45.25 (0.89)	45.97 (2.85)	46.61 (1.41)	41.73 (1.27)
Get promoted 6 months earlier than expected	61.58 (0.88)	60.91 (2.77)	63.33 (1.36)	57.57 (1.29)

Table 19. Predicted reenlistment rates (standard errors) for different samples (continued)

Attribute Level	Full sample	E3 and below subsample	E4 subsample	E5 and above subsample
Current condition	58.12 (0.89)	57.7 (2.79)	59.8 (1.38)	54.53 (1.30)
Get promoted 12 months sooner than expected	61.79 (0.88)	61.86 (2.74)	63.33 (1.36)	58.23 (1.30)
(section heading illegible)				
6 months prior to PRD	53.92 (0.90)	54.05 (2.8)	55.49 (1.41)	50.24 (1.3)
12 months prior to PRD	58.42 (0.89)	57.91 (2.79)	60.14 (1.38)	54.77 (1.3)
18 months prior to PRD	55.65 (0.90)	55.07 (2.79)	57.16 (1.39)	52.52 (1.3)
(section heading illegible)				
3 hours per workweek	64.83 (0.88)	64.39 (2.75)	66.48 (1.34)	61.29 (1.30)
6 hours per workweek	67.48 (0.87)	66.72 (2.75)	69.2 (1.32)	63.96 (1.30)
10 hours per workweek	67.04 (0.88)	66.56 (2.77)	68.72 (1.35)	63.46 (1.31)
(section heading illegible)				
Increased storage and locker space	67.06 (0.87)	67.09 (2.75)	68.8 (1.34)	63.05 (1.31)
Increased recreational space	63.9 (0.88)	64.1 (2.77)	65.64 (1.35)	59.81 (1.31)
Increased berthing space	66.83 (0.88)	67.76 (2.77)	68.36 (1.34)	62.81 (1.31)
(section heading illegible)				
Live on ship	31.04 (0.82)	32.14 (2.65)	32.39 (1.30)	27.33 (1.13)
Live in 3- to 4- person barracks	37.11 (0.84)	38.98 (2.7)	38.43 (1.32)	33.03 (1.17)
Live in 1- to 2- person barracks	44.34 (0.87)	56.01 (2.85)	46.20 (1.36)	39.89 (1.24)

Table 20. Predicted reenlistment rates (standard errors) for different samples

Attribute level	Married subsample	Single subsample	Dependent children subsample	No dependent children subsample	Sea duty subsample	Shore duty subsample
Current condition	59.06 (1.11)	57.83 (1.41)	60.53 (1.19)	57.66 (1.26)	59.28 (1.05)	54.1 (1.73)
(section heading illegible)						
1- year obligation	55.93 (1.14)	54.85 (1.43)	56.7 (1.23)	54.79 (1.27)	56.24 (1.06)	51.13 (1.72)
5-year obligation	47.4 (1.16)	46.25 (1.41)	48.92 (1.24)	46.06 (1.26)	47.62 (1.06)	42.67 (1.68)
6-year obligation	39.12 (1.14)	37.94 (1.44)	40.55 (1.25)	37.77 (1.23)	39.34 (1.05)	34.33 (1.59)
(section heading illegible)						
3 percent increase	70.67 (1.06)	68.6 (1.4)	72.87 (1.09)	68.36 (1.25)	70.13 (1.02)	65.47 (1.69)
6 percent increase	77.5 (1.03)	74.46 (1.38)	80.19 (1.03)	74.21 (1.24)	75.96 (1.01)	72.47 (1.66)
10 percent increase	81.02 (1.03)	77.44 (1.39)	83.91 (1.01)	77.2 (1.25)	79 (1.02)	75.81 (1.67)
(section heading illegible)						
1/2-point increase	67.28 (1.08)	65.55 (1.39)	69.35 (1.11)	65.31 (1.25)	67.16 (1.03)	61.77 (1.69)
1-point increase	69.87 (1.07)	67.69 (1.39)	71.79 (1.09)	67.51 (1.25)	69.28 (1.02)	64.48 (1.7)

Table 20. Predicted reenlistment rates (standard errors) for different samples (continued)

Attribute level Current condition	Married subsample 59.06 (1.11)	Single subsample 57.83 (1.41)	Dependent children subsample 60.53 (1.19)	No dependent children subsample 57.66 (1.26)	Sea duty subsample 59.28 (1.05)	Shore duty subsample 54.1 (1.73)
2-point increase	72.5 (1.07)	70.59 (1.4)	74.66 (1.08)	70.35 (1.25)	72.26 (1.03)	66.8 (1.7)
Entire SRB paid in annual installments	52.94 (1.14)	52.8 (1.42)	54.53 (1.23)	52.51 (1.27)	53.94 (1.06)	48.99 (1.72)
75% paid up front, remainder in annual installments	59.16 (1.12)	58.3 (1.42)	60.73 (1.19)	58.07 (1.27)	59.72 (1.05)	54.26 (1.73)
Entire SRB paid up front	56.79 (1.13)	55.88 (1.42)	58.35 (1.21)	55.66 (1.27)	57.25 (1.06)	52.08 (1.71)
$50 per month	67.22 (1.08)	65.88 (1.39)	69.51 (1.11)	65.55 (1.25)	67.41 (1.03)	61.98 (1.7)
$125 per month	73.11 (1.05)	70.99 (1.39)	75.67 (1.06)	70.68 (1.24)	72.65 (1.02)	67.45 (1.68)
$200 per month	75.03 (1.05)	72.83 (1.39)	77.99 (1.05)	72.45 (1.25)	74.6 (1.02)	68.98 (1.68)
Up to 3% of basic pay	66.49 (1.08)	64.39 (1.4)	68.79 (1.12)	64.14 (1.25)	65.98 (1.03)	61.08 (1.72)
Up to 5% of basic pay	67.47 (1.07)	65.18 (1.4)	69.63 (1.12)	64.96 (1.25)	66.83 (1.03)	61.84 (1.71)
Up to 7% of basic pay	70.56 (1.06)	67.78 (1.39)	73.11 (1.08)	67.54 (1.24)	69.42 (1.02)	65.04 (1.69)
Location guarantee	76.49 (1.04)	74.09 (1.4)	79.09 (1.05)	73.8 (1.25)	75.7 (1.02)	71.01 (1.68)
Duty guarantee	73.52 (1.06)	71.08 (1.4)	75.77 (1.08)	70.86 (1.25)	72.78 (1.02)	67.76 (1.71)
Location & duty guarantee	79.79 (1.03)	76.72 (1.4)	82.03 (1.03)	76.86 (1.25)	78.37 (1.02)	74.23 (1.68)
30% of the time	56.71 (1.13)	55.42 (1.42)	58.14 (1.21)	55.26 (1.27)	56.93 (1.06)	51.53 (1.74)
75% of the time	58.64 (1.12)	57.24 (1.41)	60.05 (1.19)	57.09 (1.26)	58.72 (1.04)	53.57 (1.74)
95% of the time	55.33 (1.13)	54.14 (1.42)	56.68 (1.21)	53.65 (1.27)	55.19 (1.05)	50.48 (1.75)
Get promoted 6 months later than expected	45.47 (1.15)	45.19 (1.41)	46.16 (1.26)	45.08 (1.26)	46.39 (1.06)	41.29 (1.7)
Get promoted 6 months earlier than expected	62.72 (1.09)	61.33 (1.4)	64.39 (1.16)	61.04 (1.25)	62.79 (1.03)	57.38 (1.72)
Get promoted 12 months sooner than expected	62.79 (1.10)	61.48 (1.4)	64.49 (1.16)	61.27 (1.25)	62.98 (1.03)	57.66 (1.71)

Table 20. Predicted reenlistment rates (standard errors) for different samples (continued)

Attribute level	Married subsample	Single subsample	Dependent children subsample	No dependent children subsample	Sea duty subsample	Shore duty subsample
Current condition	59.06 (1.11)	57.83 (1.41)	60.53 (1.19)	57.66 (1.26)	59.28 (1.05)	54.1 (1.73)
6 months prior to PRD	54.51 (1.14)	53.74 (1.43)	55.64 (1.22)	53.59 (1.27)	55.17 (1.06)	49.58 (1.73)
12 months prior to PRD	59.7 (1.11)	58.02 (1.41)	60.99 (1.18)	57.92 (1.26)	59.54 (1.04)	54.5 (1.73)
18 months prior to PRD	57.69 (1.12)	55.02 (1.42)	58.81 (1.21)	65.31 (1.25)	56.62 (1.05)	52.28 (1.72)
▨ ▨ ▨ time to voluntary education classes and study ▨ ▨ ▨						
3 hours per workweek	66.31 (1.07)	64.37 (1.4)	68.33 (1.11)	64.15 (1.25)	65.74 (1.03)	61.66 (1.71)
6 hours per workweek	69.33 (1.05)	66.91 (1.39)	71.39 (1.08)	66.72 (1.24)	68.34 (1.02)	64.48 (1.69)
10 hours per workweek	69.4 (1.07)	66.31 (1.4)	71.49 (1.09)	67.04 (1.26)	67.76 (1.03)	64.54 (1.71)
▨ ▨ ▨ the size of shipboard living spaces ▨ ▨ ▨						
Increased storage and locker space	67.79 (1.07)	66.83 (1.39)	70.02 (1.12)	66.48 (1.25)	68.3 (1.03)	62.72 (1.68)
Increased recreational space	65.21 (1.09)	63.5 (1.4)	67.18 (1.14)	63.27 (1.25)	65.05 (1.04)	59.91 (1.7)
Increased berthing space	68.3 (1.07)	66.38 (1.4)	70.04 (1.12)	66.21 (1.25)	68.04 (1.03)	62.63 (1.69)
▨ ▨ ▨ housing during sea duty ▨ ▨ ▨						
Live on ship	33.39 (1.1)	30.32 (1.27)	34.36 (1.22)	30.4 (1.14)	31.68 (0.98)	28.81 (1.5)
Live in 3- to 4- person barracks	39.71 (1.09)	36.3 (1.31)	40.76 (1.21)	36.4 (1.17)	37.86 (1.00)	34.5 (1.52)
Live in 1- to 2- person barracks	46.4 (1.11)	43.7 (1.37)	47.71 (1.22)	43.69 (1.22)	45.15 (1.04)	41.51 (1.61)

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